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Table of Contents

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| | | | |
|--|--------------|---|--------------|
| ORIGINAL ARTICLES— | PAGE. | MEDICAL SOCIETIES— | PAGE. |
| "Some Aspects of Modern Treatment by Radium", by JOHN MAYO, M.B., B.S., F.R.C.S. | 643 | Melbourne Paediatric Society | 672 |
| "Hospital Administration Abroad", by A. G. STEPHENSON, F.R.I.B.A. | 653 | The Medical Sciences Club of South Australia | 673 |
| "The Synovial Sheaths and Fascial Spaces of the Hand", by W. E. A. HUGHES-JONES | 658 | | |
| REPORTS OF CASES— | | MEDICAL RESEARCH— | |
| "A Case of von Gierke's 'Glycogen Accumulation Disease'", by HERBERT J. SOLOMON, M.B., Ch.M., and PHYLLIS M. ANDERSON, M.B., Ch.M. | 660 | An International Standard for Oestrus-Producing Hormone | 674 |
| REVIEWS— | | | |
| Childbirth as Nature Would Have It | 661 | OBITUARY— | |
| The Endocrines | 662 | Thomas Rupert Henry Willis | 674 |
| The Common Cold | 662 | Wahab McMurray | 675 |
| LEADING ARTICLES— | | CORRESPONDENCE— | |
| Tuberculous Bacillæmia | 663 | Diathermy of Tonsils | 675 |
| CURRENT COMMENT— | | An Explanation | 675 |
| Syringomyelia | 664 | PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS— | |
| ABSTRACTS FROM CURRENT MEDICAL LITERATURE— | | Tasmania | 675 |
| Therapeutics | 666 | BOOKS RECEIVED | 676 |
| Neurology and Psychiatry | 667 | DIARY FOR THE MONTH | 676 |
| BRITISH MEDICAL ASSOCIATION NEWS— | | MEDICAL APPOINTMENTS | 676 |
| Scientific | 668 | MEDICAL APPOINTMENTS VACANT, ETC. | 676 |
| Medico-Political | 672 | MEDICAL APPOINTMENTS: IMPORTANT NOTICE | 676 |
| | | EDITORIAL NOTICES | 676 |

SOME ASPECTS OF MODERN TREATMENT BY RADIUM.

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THE treatment by radium of disease, and of malignant disease in particular, has passed through several phases.

It was Becquerel who first described the phenomenon of radioactivity in 1896, and it was again Becquerel who—with a tube of radium prepared by the Curies, in his waistcoat pocket—unwittingly discovered the action of these rays upon the living organism. That was in 1901. Previously, in 1899, the first cure of malignant disease by radiation had been accomplished by means of X

rays. This was the case of an elderly man with advanced epithelioma of the cheek, proved histologically, and occurred in Sweden.

In 1902, Danlos commenced clinical experiments with radium at the St. Louis Hospital in Paris, and in 1904 published his results. Two years after this the first radium centre was established. And in other countries also the new agent was eagerly investigated and put to clinical use.

It was not until 1907, however, when Dominici⁽¹⁾ published his classical work on the utilization of γ rays in therapy, that treatment on modern lines began. Dominici insisted on the necessity of filtering off the α and the β rays by the use of heavy screens, and stated that with this method the damage to healthy tissue was reduced to a minimum, while still retaining the effect on the neoplastic tissue.

Even after this, much of the work that followed was disappointing. Radium used haphazardly by

¹ Read at a meeting of the South Australian Branch of the British Medical Association on August 31, 1933.

those unfamiliar with its attributes brought only too frequently disaster to the patients and in a few cases death to the users.

These failures tended to bring radium into disrepute, and it is only in post-war years that, with trained workers, radium has come into its own, and is, in certain fields, without a rival.

France has always led the world in matters connected with radium. She still does so, and this is to be ascribed, not only to the discovery of the element by the Curies, but also to the early formation of cancer centres established largely owing to the efforts of Bergonié.

Belgium, Sweden and Germany are also well to the fore, but England has, until recently, lagged behind. As an exception the Manchester Radium Institute deserves honourable mention. During the last few years, with the establishment of radium centres under the Radium Commission, progress has been rapid. The changing viewpoint, observable to one who has been in England for some years, is almost bewildering. One whole-hearted advocate of radon seeds has become an ardent adherent of mass radiation. Fewer drastic operations are performed in those diseases that have proved themselves amenable to radium, and the stoutest opponents of radiation in general are resigning more cases to its treatment. That this is so is no mere impression. Part of my time for some months at the end of last year and the beginning of this year was spent in compiling statistics, both radiation and surgical, and, although I am not in a position to quote any figures, they bear out my statements very completely.

There is no doubt that with the proper organization of radium attack by trained workers, very gratifying results can be obtained. One can look forward to a hopeful percentage of cases free from disease for five years or more in those lesions for which it has proved itself suitable.

It is obviously impossible in a paper of this length to deal with the whole scope of radium therapy. It is intended, therefore, to give a brief account of the organization of the clinic in which I had the good fortune to work for nearly two years, to touch lightly upon the general position of radium treatment, and to deal somewhat more fully with certain sites.

The Clinic at the Middlesex Hospital.

One may commence with a few words about the clinic at the Middlesex Hospital. At this institution there have been special cancer wards since the seventeenth century. Radium has been in use from soon after its discovery, and it was here that one of the earliest attempts at mass radiation was made over twelve years ago with a simple container holding two and a half grammes of radium. One hundred and sixty-eight patients were then treated.

More than two and a half times as many new patients with cancer attend this hospital each year as attend any other London hospital. Saint Bartholomew's, I believe, and the Cancer Hospital

at Fulham come next, with less than two-fifths of the number apiece.

Attached to the cancer wards are the Barnato Joel Laboratories. They are in the closest contact, as one needs merely to cross a footbridge to pass from one to the other. These are physical laboratories, devoted solely to research in connexion with radiation in its various aspects, animal experimentation being included. No other problems are studied.

Not only is the spatial association a close one, but there is the closest interlinking of the services, on the one hand clinical, on the other physical. Professor Russ, who is in charge, is one of the outstanding figures of the Radium Commission.

The hospital possesses, or has on loan from the Commission, a total of about three and a half grammes of radium. One gramme is in the form of a mass radiation unit, or "bomb", six hundred milligrammes are in solution for the production of radon, and the remainder is chiefly in needles and tubes, with a few other small applicators. The hospital is also a radon centre, and supplies radon to a number of other hospitals, some in London, and others as far afield as Scotland. This, as well as the hospital's own supply of radon, is all drawn from the six hundred milligrammes in solution. Two technicians are fully employed in this branch of the work, and have been doing nothing else for twelve years, though not all this time at the Middlesex Hospital.

On the clinical side are two wards of twelve beds each for male and female patients, solely for patients undergoing radiation treatment, a treatment room for the manufacture of moulds and so forth, and an operating theatre for radium work only. Latterly the halves of two further wards have been included, and a room has been fitted up to house the gramme unit and in which to treat patients with this latest addition to the armamentarium. There are now, therefore, a total of thirty-six beds for patients undergoing radiation treatment, and the department completely occupies one floor, the half wards overflowing on to the floor below.

Patients from any honorary medical officer who need this treatment are admitted to these wards and the work is carried out almost entirely by the radium staff, of which B. W. Windeyer, a Sydney graduate, is the head. When surgical measures are needed, such as dissection of the glands of the neck, the patient is transferred to the wards of the honorary surgeon in question. Of course, an honorary medical officer is in the position to insist upon inserting the radium himself, but few, if any, do, as it has been found that results are very much better when a permanent radium staff carries out such treatment. Windeyer worked with Regaud in Paris for eight months or more, and his ability and enthusiasm have done much to bring the work into line with the best French technique. Through these wards, too, passes a constant stream of visitors from other countries. Bloodgood, Berven, Lacassagne, Lenz, Kaplan, Holfelder, Edmund Kelly, and

Burnam are but a few that I remember. Nor did Australia neglect us, as we saw Sir Alexander MacCormick, Sir Henry Newland, Dr. H. M. Moran, Dr. Stanley Verco, and many others.

The honorary staff of the hospital is too well known to need any comment. It is sufficient to mention the names of Mr. Sampson Handley and Mr. Victor Bonney to indicate its eminence. With all these advantages the fortunate worker would be poor indeed did he not derive some benefit.

Points in the Physics of Radium.

This is not the place in which to say much about the physics of radium, but one or two points call for mention. As you all know radium breaks down into radium emanation or radon, giving off α , β and γ radiation in the process.¹ Subsequently the radon also disintegrates, with further radioactivity, and ignoring some subdivisions, disintegrates successively into radium *A*, *B*, *C*, *D*, *E* and *F*. The activity of radon tubes is chiefly due to radon and radium *A*, *B* and *C*, of which the last perhaps is therapeutically the most important. In a sealed radium tube the entire sequence is responsible for the radioactivity observed.

Alpha rays are intensely active, but are easily stopped, even by a sheet of paper. They are helium atoms that have lost two electrons, and, in consequence, have a positive charge. It is these rays that are thought to have been responsible for the production of bone sarcomata in the unfortunate girls who painted the luminous figures on the dials of watches. They have no use in therapy, and to the venturesome purchaser of quack radium medicines are a source of great danger. The trouble is that some of these advertised radium medicines do actually contain radioactive matter. And ten microgrammes of radium element, that is, one-hundredth of a milligramme have been sufficient to produce death when taken internally.

But this is a divergence.

Beta rays are electrons travelling at high speed, and have a much greater penetrating power than the α particles. Fifty *per centum* of hard β rays from radium *B* and *C* will pass through 0.06 millimetre of platinum, and it takes 0.6 millimetre of platinum to stop 99.9% of these rays.⁽²⁾

In Europe β radiation is not much used, Dominici's teaching having had a powerful effect. He held that it produced a local necrotic or caustic effect, was unselective in action, and failed to exert any curative effect at a distance greater than one centimetre at the maximum.

Gamma rays are generally considered to be high frequency vibrations resembling X rays, only of shorter wave-length. They have enormous penetrative power. Clark, of the Barnato Joel Laboratories, told me that he could still detect their presence after using a screen of six feet of lead. These are the rays that Dominici taught should be used therapeutically. He believed that they had a

selective action upon tumour tissue. But about this there is still much argument.

To produce a comparable wave-length with X rays one would need a potential of over a million volts and a tube to stand up to it. Experimental work is, however, being carried out in this direction. The equipment at the Memorial Hospital, New York, and at Pasadena, California, may be instanced as an example of this. At the latter place the tube, which is thirty-two feet long, is mounted vertically through three floors, the middle floor being the one where treatment is to take place.

It is because of the extreme penetrating power of γ rays and the constancy of output that radium may, on occasion, produce better results than X rays. The coefficient of absorption increases rapidly with an increase in wave-length, so that constancy of output is of considerable importance.

In accordance with the teaching of Dominici the filtration used in Europe is rarely less than 0.5 millimetre of platinum, and in certain situations may be as much as 1.5 millimetres of platinum or more. The filtration needed depends upon the intensity of the source.

Throughout this paper the French notation of dosage will be used, that is to say, millicuries destroyed.

We know that one gramme of radium element produces 7.5 millicuries of radon in an hour, and that a corresponding quantity of radon undergoes disintegration and is destroyed. Correspondingly, one milligramme destroys 7.5 microcuries per hour, and 1.33 milligrammes destroy 10 microcuries in an hour, therefore, in 100 hours it destroys $100 \times 1.33 = 133$ milligramme-hours = 1,000 microcuries or one millicurie destroyed.

So that the method of converting milligramme-hours to millicuries destroyed is simply to divide by 133.3. The advantage of this method is that not only is the dosage accurately described, but that the dosage of radium and radon can be instantly compared.

It must be remembered, of course, that only a small portion of this energy may be utilized. Some European clinics endeavour to estimate dosage in ergs per cubic centimetre, but I am informed by a competent physicist that the error may be as great as 300%.

Methods of Application of Radium.

The methods of application of radium and its emanation radon, are three in number: (i) interstitial, (ii) intracavitory, (iii) superficial: (a) surface, (b) mass radiation. These terms are, of course, familiar to you. The first is used in connexion with the direct insertion of needles into the tissues, the second with the placing of radium in the natural cavities of the body, while the third includes, on the one hand, application by means of moulds, plates and the like, and on the other, the more recent development of mass radiation which is variously termed teleradium or telecurietherapy, the appliance used being described as a bomb, unit or pack.

¹ Some authorities state that only α and β rays are given off at this stage.

In many cases a combination of methods may be used, and X radiation is often utilized in addition.

The sites where cancer has been most consistently benefited by radium are: The skin, the lip, the tongue, the floor of the mouth, the pharynx, the uterine cervix, the body of the uterus, the penis, the breast, the maxillary antrum.

You will notice that some of these divisions are arbitrary, in that several are special skin sites. However, the growth at these sites tends to behave in a characteristic fashion and separate mention is therefore made. Another special skin site, the anus, might also be added.

The maxillary antrum is included with some hesitation, as the cases I have seen benefited are too recent to allow one to dogmatize.

The Skin.

There is little new to be said about the treatment of skin cancer. The important point is to deliver a lethal dose in one treatment. The time factor is thought to be of importance, and the dose should be spread out over four or five days. Fractional doses and repeated visits give disappointing results. Epitheliomata are more difficult to eradicate than rodent ulcers, though the latter can be hard enough to cure if invading bone or cartilage. The radium is usually mounted on moulds at a distance of one or two centimetres from the skin, sometimes less, the distance depending on the depth of the lesion. Columbia paste forms a convenient material for the moulds. Results are excellent.

Burnam, in America, gives similar doses, but achieves it in a short time by the application of a large mass of radium, such as a gramme.

The Lip.

Regaud now treats lip cancer by superficial radium. A mould of Columbia paste is made to fit the lip, and on this the radium is mounted. The mould is curved so as to irradiate the lip from both its inner and outer aspects, thus producing a cross-fire effect. In early cases it may be unnecessary to dissect the glands of the neck. Results are extremely good, there being a high proportion of cures and practically no scarring.

The Tongue.

The prognosis for tongue cases depends in part upon the situation of the growth. It is better for the anterior two-thirds of the dorsal surface, but less good for the posterior third, under surface of the tongue and floor of the mouth. Regaud groups these last two sites together.

Even more important from the prognostic point of view is the presence or otherwise of secondary deposits in the glands of the neck. Quite frequently one can eradicate the primary lesion, only to fail with the glands.

Roux-Berger and Monod⁽⁴⁾ give the following figures of patients treated at the Institut du Radium of Paris: Of a total of 311 patients with epithelioma of the tongue or floor of the mouth

treated between 1920 and 1925, 287 are taken for purpose of analysis.

The percentage of five year cures shows an improvement from 11.3% in 1920 to 38.9% in 1925. The improvement is not quite regular, in that for 1921 the percentage was 37.1. But apart from that year, which was exceptional at that time, the curve is almost continuously progressive.

Of these cases only 19% were operable, and the total percentage cured amounted to 26.8%.

Divided into sites the results are as set out in Table I.

TABLE I.

| Site. | Patients Treated. | Number of Cures. | Percentage. |
|-------------------------|-------------------|------------------|-------------|
| Anterior dorso-lingual | 151 | 47 | 31.1 |
| Posterior dorso-lingual | 72 | 14 | 19.4 |
| Infra-lingual | 64 | 16 | 25.0 |

Their statements with regard to invasion of the glands are interesting. They say that among thirty-seven patients who presented no clinical signs of gland enlargement, seven at least developed secondary deposits in the glands, the primary lesion remaining cured. On the other hand, of forty-two who had definitely enlarged glands but did not submit to any treatment of them, eleven remained cured, showing, presumably, that the enlargement in these cases was inflammatory.

The method of treatment of the tongue by radium has, in the past, been almost exclusively by interstitial radiation, suitable needles being buried in the tongue, and usually left there for about a week. For the anterior portion of the tongue this can be done under local anaesthesia.

Following the treatment of the primary lesion a block dissection of one side of the neck is as a rule performed, with removal of the sterno-mastoid muscle and the internal jugular vein.

If enlarged fixed glands are present, some form of radiation is given to the neck in place of the dissection. The type of growth is also of importance, as a rapidly growing non-keratinizing type of epithelioma is unlikely to do well with surgery, but may respond miraculously to radium. Especially is this true with the type of growth described by Regaud as lympho-epithelioma.

Quick, of the Memorial Hospital, New York,⁽⁵⁾ gives a summary of 450 cases of carcinoma of the tongue. Of these 186 were without obvious glandular involvement, and 73 patients remained clinically free from disease. One hundred and sixty-one had palpable glands, very few being operable. Only twelve patients became and remained free from disease.

Of the entire group of 450 patients 101 are now clinically free from evidence of disease. This gives a percentage of twenty-two, which compares very favourably with the best surgical statistics for

operable cases. This group contained only 35% of such cases.

Recently one has seen cases of carcinoma of the tongue treated with teleradium with apparently good results. Dosage of up to seven millicuries destroyed per square centimetre has been given at a distance of five centimetres from the skin, with a filtration equal to 1.5 millimetres of platinum. Numerous ports of entry are used and the lesion is irradiated from both sides. With care it is possible to deliver to the growth well over 100% of the skin dose at any one port.

Dosage such as this is apt to upset the patient's general condition moderately, and locally a considerable reaction develops, first upon the mucous surfaces and subsequently upon the skin. Whether the results are likely to be permanent remains to be seen, but I have seen the primary lesion in early cases, verified histologically, disappear without other treatment.

At Radiumhemmet, Stockholm,⁽⁶⁾ the methods in use are different. Early cases involving the antero-lateral margins and the dorsal surface of the tongue are treated by diathermy and interstitial radiation. The needles are of high intensity—ten milligrammes radium element with a filtration equal to 0.5 millimetre of platinum. The duration of treatment varies from two and a half to five hours, depending upon the number of needles used.

With more widespread lesions and in growths of the inferior surface and posterior third a different technique is used. Treatment is carried out in three stages. A dosage of seven to ten gramme hours is given at a distance of five centimetres through several ports of entry. Three or four weeks later the growth is coagulated with diathermy and interstitial radiation is then used. Latterly Berven has successfully treated patients by means of his three gramme unit alone.

At the Memorial Hospital, New York,⁽⁷⁾ surgery is used only for the removal of bone following secondary invasion and occasionally to gain access to the growth. Teleradium is used in the form of a four gramme pack applied to both sides of the neck, dealing with both the primary site and the lymph drainage area. Radium is preferred to X rays. If the growth is of the keratinizing type, interstitial radiation may be used in the form of radon seeds. Diathermy is used to remove bulky fungating masses if necessary.

For growths of the floor of the mouth the practice at the Middlesex Hospital has been to combine interstitial radiation with surface applicators, both internal and external. This is in accordance with French technique. More recently they have been treated with the gramme unit, either with or without interstitial radiation.

The Tonsil.

At Radiumhemmet a particular technique has been developed. A special clamp has been devised which fits against the tonsil. To the inner blade of this radium is fastened with due precautions as to

filtration of secondary rays. It is kept in place for a number of hours, local anaesthesia being employed, and the lesion is also treated with a three gramme pack from the surface. Berven's results with this method have been distinctly satisfactory, giving 50% of three-year cures for Grades I and II carcinoma, none for Grade III, and 75% for lymphoepithelioma. I have no personal experience of this technique.

I have, however, some experience of treating these lesions by means of interstitial radiation and surface therapy, on the one hand, and also by means of a one gramme unit. The statistics have not yet been published, and therefore no figures can be given, but a number of patients showed no signs of recurrence when seen early this year. As an illustrative case, treated before the installation of the gramme unit, one might mention a patient whose growth, of the right tonsil, proved to be lymphoepithelioma.

He was treated with interstitial radon in September, 1931, a dose of 12.8 millicuries destroyed being given to the tonsil and 16.5 millicuries destroyed to the neck. Subsequently moulds were made for each side of the neck, 231 millicuries destroyed being given on the affected side and 264 millicuries destroyed on the other. At December, 1932, the tonsil was soft and supple, showing practically no scarring, and there was no sign of recurrence either there or in the neck.

It might be emphasized that with this type of growth surgery gives disastrous results.

At this point mention must be made of Coutard's technique⁽⁸⁾ for treatment of the tonsil with X rays, fractional doses being given over a period of twenty-five days or more. His results show 23% of five year cures.

The Pharynx and the Larynx.

In connexion with this region one may mention growths of the pharynx and larynx. These may be treated by interstitial radiation, as, for example, the fenestration method of Finzi and Harmer for intrinsic carcinoma of the larynx. To carry this out the thyreoid cartilage is exposed, the perichondrium is stripped and one ala is resected, making a window displaying the inner layer of perichondrium covering the growth. The laryngeal cavity is not opened. Into this window the radium needles are placed and left for a week. The dosage is about ten millicuries destroyed.

Of eight early cases treated by them, in six the growth disappeared and the patients remained well for from one to three years. Among five advanced cases, one patient remained well for four years.

Telecurietherapy may be employed without surgical intervention, or Coutard's technique with X rays may be utilized. He gives a five year survival rate of 10% for epitheliomata of the hypopharynx and 28% for the larynx.⁽⁹⁾

In the absence of a radium pack one can utilize moulded applicators with heavy dosage. Among various cases treated the following case comes to mind.

A man had an extensive growth in his right pyriform fossa, extending to and ulcerating the epiglottis. There was also a large fixed glandular mass in the neck,

measuring about six by eight centimetres in area. He was treated first by interstitial radiation of the gland mass, then by moulded applicators carrying 400 milligrammes radium element to each side of the neck and worn for about a week. The reaction was intense, but three months later the throat specialist reported that the primary lesion had healed and, although portion of the epiglottis had disappeared in the ulcerative process, there was no sign of growth. No glands were palpable at this stage.

I do not put forward this case as likely to be a cure, but simply to show the effect of surface radiation. Dr. Stanley Verco has had, I believe, similarly good results in patients treated with X rays.

Other cases could be cited, but the work is yet too recent to permit definite conclusions to be drawn.

The Maxillary Antrum.

While I am dealing with this region of the body I should like to devote a few minutes to carcinoma of the maxillary antrum. The treatment of this condition has in the past been either surgical with removal of the maxilla, or radiation by interstitial or intracavitory means. Both of these latter methods, if pushed to a point where cure becomes possible, nearly always produced an extensive bony necrosis, the cosmetic result being unsatisfactory. Latterly we have treated some five or six patients by a preliminary intranasal antrostomy followed by teleradium. Again I must state that results are too recent to permit any conclusions to be drawn, but every patient improved enormously, and in most the growth disappeared. The contours of face and buccal cavity returned to normal, no disfigurement being left. Some years, however, must elapse before we can evaluate the efficacy of this method. Berven has some cures of two years' duration.

The Uterine Cervix.

The next site with which I propose to deal is that of the uterine cervix. About this there has been, and still is, a sharp division of opinion. I think, however, it is fair to say that in Europe, England and America the great mass of educated opinion is more in favour of radiation than operation. Thus at the University Gynaecological Clinic at Munich, under Döderlein, since 1912 no patient has been treated by any method other than radiation.⁽¹⁰⁾ During the succeeding twenty years 3,000 patients have been treated, and as a result of his experience Döderlein considers that radiological treatment does everything that radical surgery can do and, moreover, can be used when operation is impossible. Quoted by Voltz, he has said:

I have long maintained that the day of the dangerous and drastic radical operation is over. If it is possible to treat women by a much simpler, a safe and a painless method, with as much prospect of success, this method must be given preference over the knife.

Ewing, in "Neoplastic Diseases",⁽¹¹⁾ states:

In recent years improvements in the technique of radiation therapy and longer periods of observation, by Kelly, Clarke, Forssell, Regaud, Bailey and Healy, and many others, have established the superiority of radiation, properly carried out, over surgery in the treatment of uterine cervical cancer.

On the other hand, there are various exponents of the Wertheim operation, of whom, perhaps, Victor Bonney is the most outstanding. I have on numerous occasions watched him perform this operation. There must be few surgeons who carry out such a widespread removal as he does, removing the vagina almost to the outlet, glands from the obturator fossa, and, if necessary, removing aortic glands also. It is a tribute to the excellence of his work that for the last 128 occasions he has performed this operation his primary operative mortality has been as low as 9%.⁽¹²⁾ He gives his absolute five-year cure rate, with deductions, as 25.4%. This is a very good result, and is comparable to the best radium figures, but no better, and if one considers only operable cases, the radium figures far surpass his. One need only quote Lacassagne's⁽¹³⁾ figures for the four years 1923 to 1926, inclusive, which give for Stages I and II of the League of Nations classification the astonishing five-year survival rate of Stage I, 86%, and Stage II, 42%. For all four stages the rate is 33%. But I will reproduce the table in full (Table IV).

These are, of course, the best figures in the world for radium treatment of this complaint, being an improvement on those of Radiumhemmet. Nevertheless both institutions show good results. For the purpose of comparison I have included tables from the report of the Royal Canadian Commission on "The Use of Radium and X Rays in Treatment of the Sick" *et cetera* (Tables II and III).

The Marie Curie Hospital, London, is treating a great many cases of this complaint. Although this institution commenced work only at the end of 1925, they are now treating upwards of one hundred cases of carcinoma of the cervix each year, the actual figures for the years 1929, 1930 and 1931 being 111, 135 and 126 respectively. They are using the Stockholm technique. The hospital is entirely run by women. Of the 73 patients treated by them up to the end of 1926, twenty, or 27%, were alive five years later.⁽¹⁴⁾

There are three main schools of treatment in Europe, being that of the Institut du Radium of Paris, associated with the name of Regaud; that of Radiumhemmet, instituted by Forssell and carried on subsequently by Heyman and Berven; and that of the University of Munich, under the direction of Döderlein.

The methods of the three clinics may be briefly summarized.

The Paris Technique.—At Paris⁽¹⁵⁾ the radium treatment is accomplished as a rule in five days. There is a preliminary dilatation of the os and biopsy, the normal surgical ritual being observed. The following day radium is inserted. The container for the uterine radium is a gum elastic tube—the end of a number 14 bougie does very well. In this three tubes are placed in series, two of a content of 13.3 milligrammes of radium element each, being placed one at the end which is to be nearest the fundus and one in the middle, while a tube containing 6.6 milligrammes of radium element is placed at

TABLE II.
Radical Surgical Treatment of Cancer of the Cervix.⁽¹⁰⁾

| Clinic. | Total Number of Cases Seen. | Total Number of Cases Operated On. | Primary Mortality, Percentage. | Relative Cures, Percentage. | Absolute Cures, Percentage. |
|---------------------------|-----------------------------|------------------------------------|--------------------------------|-----------------------------|-----------------------------|
| Johns Hopkins Hospital .. | 387 | 290 | 14.23 | 26.6 | 13.70 |
| Wertheim | 690 | 345 | 18.00 | 42.4 | 18.30 |
| Schweitzer | 443 | 177 | 6.78 | 51.4 | 19.80 |
| Petersen | 380 | 60 | 26.60 | 40.0 | 6.60 |
| Collected by Duncan, 1921 | 5,027 | 3,151 | 3.54 | 19.2 | 11.72 |
| Bonney ¹ | 420 | 265 | 14.90 | 39.6 | 25.0 |

¹ Includes 21 cases lost sight of.

TABLE III.⁽¹⁰⁾
Radium Treatment of Cancer of the Cervix.

| Clinic. | Total Number of Cases Treated. | Primary Mortality. | Relative Cures of Operable Cases, Percentage. | Absolute Cures, Percentage. |
|--------------------------------|--------------------------------|--------------------|---|-----------------------------|
| Radium Institute, Paris .. | 450 | — | 80.5 | 26.20 |
| Radium Institute, London .. | 350 | — | 20.0 | 12.50 |
| Women's Hospital, New York .. | 196 | 2.00 | — | 23.60 |
| Memorial Hospital, New York .. | 578 | NIL | 41.0 | 18.50 |
| Döderlein | 755 | 6.00 | 43.6 | 14.30 |
| Bumm | 805 | — | 28.3 | 15.27 |
| Howard A. Kelly | 500 | NIL | 50.0 | 11.00 |
| Radiumhemmet, Stockholm .. | 737 | 1.19 | (31% border) All inoperable | 23.10 |

the end which is to be nearest the os. The filtration is one millimetre of platinum. These tubes are enclosed in a secondary screen of 0.1 millimetre of aluminium, which is in turn enclosed by the gum elastic container. The open end is closed by a stout silk stitch, the ends of which are left long. The whole is then inserted into the uterine cavity.

For the vaginal dose a device called a colpostat is employed. This consists of two corks mounted at the ends of a watch-spring about ten centimetres long, in such a fashion that their longer axes are at right angles to the spring and parallel to one another. A hole is drilled in the centre of each cork longitudinally, and the spring is covered with rubber. Into each cork is placed a tube containing 13.3 milligrammes of radium element screened with 1.5 millimetres of platinum or its equivalent. The opening in each cork is then closed with a small cork, and the whole water-proofed with collodion.

The colpostat is then inserted into the vagina so that the corks are pushed well up and out into the lateral fornices and lie pointing antero-posteriorly. Into the bight of the spring lying beneath the cervix one or two subsidiary corks are pushed, each containing 6.6 milligrammes of radium element and screened with 1.5 millimetres of platinum.

All these containers are removed daily and cleaned. The parts are douched and the radium is replaced. As a rule, at the end of five days it is finally removed.

The dosage is usually: Uterus, 30 millicuries destroyed, 4,000 milligramme-hours; vagina, 30 millicuries destroyed, 4,000 milligramme-hours.

Exceptionally, however, the vaginal dose may be as high as 35 millicuries destroyed.

The great value of this technique is that the vaginal radium is securely fixed in the most

advantageous position and is well screened, both primarily and secondarily. It cannot fall back against the recto-vaginal septum and cause a necrosis with subsequent fistula. Its security does not depend upon tight packing of the vagina, and a general anaesthetic is not as a rule necessary. I believe I am correct in saying that at the Institut du Radium in Paris, since this technique has been developed, they have not had a single case of recto-vaginal fistula due to radium necrosis.

Following treatment the patient has a vaginal douche twice daily to assist in removal of the detritus. Surface radiation is given by means of X rays or the four-gramme unit. Since adding this to the procedure there has been a definite rise in the percentage of five-year cures.

The Stockholm Technique.—The Stockholm technique is too well known to need much description.⁽¹⁷⁾ The main outline of the method is that 40 or 50 milligrammes of radium element are placed in a straight or angled metal container which is then enclosed in rubber and placed in the uterus. The filtration is equal to 1.5 millimetres of platinum.

The vagina is dealt with by various metal containers, sometimes cylindrical, but more often flat boxes, two to five in number. They contain between them up to 80 milligrammes of radium element. Again the filtration is equal to 1.5 millimetres of platinum. These are enclosed in rubber, or other secondary screen, placed in position in the vagina around the growth, and the vagina is then tightly packed with gauze.

The applicators are kept in place from nineteen to twenty-three hours and are then removed. Subsequent treatments are given, making two or three in all. The treatments may be at intervals of a week and a fortnight, or a week and three weeks. Subsequent X ray treatment is often given.

The total dosage by this technique should not exceed 2,600 milligramme-hours (19.5 millicuries destroyed) to the uterus, and 4,500 milligramme-hours (33.7 millicuries destroyed) to the vagina.

The Münich Technique.—At Münich X ray treatment is given to the pituitary gland in an endeavour to sensitize the growth, and is followed next day by X ray treatment of the pelvis. Two days later local treatment is given with radium and mesothorium. Intrauterine and intracervical applicators are used, supplemented sometimes with vaginal cork applicators.

The dosage is 55 milligrammes of radium element for twenty-four hours, with a total not exceeding 1,400 milligramme-hours (15 millicuries destroyed) to the uterus, and the same for the vagina. Filtration is 0.2 millimetre of silver, 1.0 millimetre of brass, and rubber. A subsequent treatment is given eight weeks later, and rarely a third.

In America, Ward and Farrar, at the Women's Hospital, New York, use combined intracavitary and interstitial radiation. They report 25% of absolute cures.⁽¹⁸⁾ Healy, at the Memorial Hospital, New York, gives intensive radiation in the vagina with a gramme bomb, in addition to using intrauterine needles and X rays. Sometimes interstitial radiation is used as well.⁽¹⁹⁾

Some time after completion of treatment, by whatever method radiation has been administered, the cervix should be smooth and healed and the tissues soft and supple. The discharge, a source of great distress to the patient, should cease and she should gain weight. Even in those cases that are not cured the improvement is as a rule striking. I have seen a number of patients who were not cured, but in almost all I can say that from the patient's point of view the procedure was well worth while. I give Lacassagne's last published table of results at the Institut du Radium of Paris⁽²⁰⁾ (Table IV).

Before leaving the subject one might mention that at the Marie Curie Hospital in London it has

been found, contrary to what one might expect, that adenocarcinoma of the cervix responded nearly as well to radiation as epithelioma.

The only primary mortality occurring with radiation treatment of carcinoma of the cervix is almost invariably due to infection, usually streptococcal.

Carcinoma of the Body of the Uterus.

In recent years carcinoma of the body of the uterus, especially in the frail and aged, has been increasingly treated with radium. Results are approximately equal to surgery. Heyman⁽²¹⁾ gives 50% of operable cases cured by radiation as against 58% cured by surgery. Healy and Cutler,⁽²²⁾ combining the figures of the Memorial Hospital, New York, Radiumhemmet, and the Berlin University Gynaecological Clinic, give 58.5% of operable cases cured by radiation.

The technique used by the Marie Curie Hospital, London,⁽²³⁾ differs somewhat from that for carcinoma of the cervix in that short cylinders threaded on wire are directed into the cornua of the uterus in addition to the central uterine applicator.

The standard intrauterine quantity of radium is 74 milligrammes for the first application, and 74 or 66 milligrammes for the subsequent applications. Three applications of twenty-two hours are given. Two flat boxes containing 20 milligrammes each are placed in the vaginal fornices for the first two applications, but not for the third.

Filtration is equal to one millimetre of platinum for the uterine applicators. Normal dosage is from 30 to 36.6 millicuries destroyed (4,000 to 4,880 milligramme-hours) for the uterus, but only about two-thirds of this is given with a small senile uterus. The vaginal dose is 13.2 millicuries destroyed (1,760 milligramme-hours). No direct application is made to the os.

Menorrhagia.

Menorrhagia is mentioned as it comes within the scope of radium treatment of the uterus. Adequate

TABLE IV.

Statistics, according to the Stage of Extension of the Lesions of Cases Treated by Radiotherapy alone, Compiled at the End of the Fifth Year After Treatment.

| Years. | Number of Patients Treated. | Stage I. | | Stage II. | | Stage III. | | Stage IV. | | Total of Patients Cured. | Percentage of Cures. |
|-------------|-----------------------------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|--------------------------|----------------------|
| | | Irradiated. | Cured. | Irradiated. | Cured. | Irradiated. | Cured. | Irradiated. | Cured. | | |
| 1919 | 83 | 4 | 2 | 22 | 5 | 38 | 2 | 18 | 0 | 9 | 10 |
| 1920 | 36 | 12 | 3 | 36 | 8 | 38 | 3 | 14 | 47 | 15 | |
| 1921 | 271 | 7 | 30 | 1 | = | 20 | = | 7 | = | 17 | 19 |
| 1922 | 63 | 7 | 4 | 33% | 25 | 104 | 6 | 111 | 0 | 0 | 26 |
| | | | | | | | | | | | |
| 1923 | 74 | 7 | 6 | 25 | 10 | 27 | 7 | 5 | 0 | 23 | 31 |
| 1924 | 68 | 3 | 3 | 19 | 9 | 41 | 36 | 10 | 0 | 24 | 35 |
| 1925 | 88 | 8 | 22 | 6 | = | 25 | 152 | 12 | 46 | 107 | |
| 1926 | 87 | 4 | 4 | 86% | 27 | 96 | 7 | 17 | 47 | 1 | 32 |
| | | | | | | | | | | | 35 |
| Totals | 588 | 52 | 29 | 200 | 69 | 263 | 55 | 73 | 1 | 154 | |
| Percentages | ... | 55 | | 34 | | 20 | | 1 | | 26 | |

examination is essential to exclude carcinoma, fibroids, and high blood pressure. Curettage should always be performed, the more certainly to exclude the possibility of malignant disease. Dosage varies with the age of the patient. Patients may be divided into three groups, namely, young girls, women of child-bearing age, and women approaching the menopause. With satisfactory dosage up to 90% of permanent cures are obtained.

Epithelioma of the Vulva.

Epithelioma of the vulva is worthy of note on account of its high degree of malignancy. Dittrich, quoted by Ewing,⁽²⁴⁾ found no recorded case in which the patient remained free from recurrence for over six years. With interstitial radium they are very prone to develop radium necrosis. Mass radiation is now being tried.

The Penis.

Epithelioma of the penis often responds well to radiation. A difficulty is the manufacture of an adequate mould. Interstitial radiation can also be used.

The Breast.

The breast has usually been held to be the province of the surgeon, but of recent years radiation has been used either alone or in conjunction with surgery. The relatively disappointing late results of surgery may have had something to do with this. Thus Janet Lane-Claypon gives five-year results of surgery.⁽²⁵⁾ In a group of 3,342 patients, at the end of five years 37.1% were alive, and in a group of 1,148 with involvement of the glands 25.4% were alive at the end of five years.

Sampson Handley in 1920 commenced to insert radium tubes in several of the intercostal spaces when performing a radical removal of the breast, and claims that his three-year survival rate has risen from 47% to 56.5%.

X ray therapy also has been employed, either alone or before or after operation, or both.

Finally, radium therapy has been used as a sole method of treatment. The best known method is that of Keynes who, in 1924, commenced to treat breasts with interstitial radiation of low intensity, using up to twenty-five needles containing three milligrammes of radium element, of an active length of 4.8 centimetres, and ten needles containing two milligrammes, of an active length of 3.2 centimetres.⁽²⁶⁾ His three-year results show the following percentage of patients alive: Stage I, operable, no palpable glands, 77.7%; Stage II, operable, palpable glands, 36.3%; and Stage III, inoperable, 46.1%.

The insertion of needles deep to the tumour followed by surface radiation with a mould has been utilized at the Middlesex Hospital for some thirty or forty cases. Early results have been good.

A combination of surgery and radium by the implantation of needles at the time of dissection of the glands has also been tried. This, combined with subsequent or prior surface radiation, has given promising results.

Mass radiation has been employed recently, and in certain types of breast appears to have a very definite sphere of usefulness. It is better with large pendulous breasts, as then a tangential beam can be used. With small flat breasts the unavoidable radiation of the thorax is apt to produce undesirable systemic and local effects.

Some growths, as one might expect, respond to radiation better than others. I can remember an adenocarcinoma that failed to show any improvement. On the other hand, many patients, after a brief period of time, showed a tremendous change for the better. A satisfactory result leaves a soft, relatively unscarred breast, with no residual mass. This is important. When such a mass can be felt, it nearly always contains active cancer cells. I formed the opinion that better results were obtained by using surface radiation in one form or another, in conjunction with interstitial rather than with interstitial alone.

In America, G. T. Pack has made use of long radon tubes up to ten centimetres in length. They are of 0.3 millimetre of gold, and are made to any required length. The breast is gridironed with these at different levels, and vertical ones also are used. The axilla is barraged with similar tubes. Total dosage is about 100 millicuries destroyed. X ray treatment is often given in addition.⁽²⁷⁾

In spite of the foregoing, however, I think that for the early case surgery is still the best treatment, combined preferably with pre-operative and post-operative X radiation. For the inoperable case radium can be of great value.

Other Sites.

Various other sites have been treated with radium, such as the rectum, prostate, bladder and oesophagus. While some of the recent work has been of greater promise, results as yet are not sufficiently uniform or certain to call for mention here.

The method used by Burnam, of Baltimore, in attacking epithelioma of the bladder is of interest. Working through an operating cystoscope, he holds one or two curies of radon against the growth for a few minutes, moving it from place to place. Such quantities are at present out of our reach. The oesophagus is usually treated with radon seeds of a special type fastened to the outer aspect of a Souttar's tube. This often brings great amelioration of symptoms, in that the dysphagia may disappear, and so may even the primary lesion. But I know of no patients cured by this means.

Sarcoma, excepting lymphosarcoma, is relatively radio-resistant. In spite of this, four out of eleven patients treated with radium at the Middlesex Hospital in 1925 were alive in 1932, and varying numbers for the succeeding years. All treated by radium in 1931 were alive in 1932.

A child with retino-glioma was treated with superficial radium in 1931 and was alive and well, with good vision and no sign of recurrence, fifteen months later.

One can only mention some of the various non-malignant conditions, such as angioma, keloid, tuberculous glands of the neck, and so forth, for which radium is of use.

Mass Radiation.

The most interesting recent development, of course, is that of mass radiation. Mention of it has recurred throughout the paper in the treatment of various sites. It is occupying a great deal of attention in England and Europe, even finding its way into the columns of *The Times*. The results are such that most clinics are increasing the intensity of the source.

Thus the Paris "four-gramme unit has been increased to eight grammes. The Brussels unit is to be fifteen grammes, while in London a five-gramme unit is to be procured, and there is some talk of making it ten grammes. At Radiumhemmet a three-gramme unit has been in use for some time, and upon the continent of Europe there are various other units or bombs in use. At the Middlesex Hospital a one-gramme unit has been in use for a year, and there was sufficient work to suggest that another could be utilized. At the Cancer Hospital, Fulham, and at University College Hospital exactly similar units are in use, while the Westminster Hospital is using a two-gramme unit.

In America, of course, many units, or packs as they are there called, are in existence. The Memorial Hospital, New York, the Women's Hospital, New York, the Mayo Clinic, and the Kelly Clinic at Baltimore are a few that use this method habitually.

There are many advantages for this form of radiation, of which the uniformity of the beam, the use of distance, and the better protection of the workers are among the most important. After an experience of over eight months with this form of therapy one can say that there is far less skin reaction in proportion to the dose than with moulded applicators. It is consistent, in that one can at will produce the desired reaction, as, for example, in the pharynx, when working at five centimetres from the neck (or more, with a more powerful unit). The beam produces an even irradiation of the field, which is difficult or impossible with any other method of using radium.

The method is an economical one, for the unit is in use for twenty-four hours of the day every day of the week.

It has the advantage over X rays of shorter wavelength and greater penetrating power, but the disadvantage of high initial cost. However, let us hope that the rich fields discovered in Canada, and now producing radium, will cause a considerable fall in price.

It has been used for breasts, glands of the neck, tongues, maxillary antra, palates, sarcomata, and many other lesions. With all the results have been worthy of note, and in some cases astonishing.

Much can be done with heavy radiation from moulded applicators, but at greater risk to the

worker. If the portents are to be believed, the future lies largely, as far as radium is concerned, with distance or mass radiation.

The Radium Worker.

A final word needs to be said about the worker. All over the world the battle has been and is being fought as to who shall employ such an agent. In the denser centres of population it has been recognized that questions of dosage, filtration, distance, intensity, and so forth are complex ones, and that such a noxious agent should be used only by the skilled worker. When radium has been employed by the general surgeon results have generally been poor. The Radium Commission in England is insisting that at each of their centres the man in charge shall be approved by them. Any obstruction or misuse of radium is likely to bring the threat of its withdrawal from the hospital.

Previously, radium had often been in the hands of honorary medical officers who were not interested in its use and who passed it to house surgeons to utilize. As a consequence results have lagged far behind those achieved upon the Continent. Since the Radium Commission has taken charge there are signs that the work has improved very greatly in quality.

At the Memorial Hospital, New York, a medical man has to serve as an intern with radium for two years before being accounted competent to use it.

The editorial for the *American Journal of Cancer* for February, 1933,⁽²⁸⁾ says:

It would be better if the radiotherapist were a member of the surgical staff, and had allocated to him the care of all the inoperable cancers entering any institution, in addition to the therapy of the cervix, of the fibromyomata of the uterus, and many of the skin and oral cavity tumours. He may work with one of his surgical colleagues, curing the local lesion of the tongue or lip with radium or X ray while the surgeon removes the nodes of the neck, but in his hands especially should be placed the inoperable cancers, chiefly for palliation, but occasionally for cure, for the fate of this group of patients is at present deplorable.

And again:

If radiotherapy is placed in the hands of men with surgical training, there will be no argument as to who handles the hospital radium and who will insert needles into the cervix, the tongue or elsewhere. Such insertion is a surgical operation, often requiring more or less extensive anaesthesia. It should be done by a man with surgical training, and no one else.

The Physics Laboratories.

The remaining factor to be considered is that of the physical problems involved in the treatment of any case. To be in close touch with the personnel of a physical laboratory is of the greatest benefit, both to the workers and to the patients. Questions of dosage at different depths, of uniformity of dose, of the testing of needles, of protection of the workers, and various other problems are constantly arising. Having worked in the closest touch with the Barnato Joel Laboratories at the Middlesex Hospital, I realize to the full the essential need of such a service if the greatest measure of success is to be attained.

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HOSPITAL ADMINISTRATION ABROAD.¹

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WHEN I was asked to lecture to you on hospital matters abroad, I consented with pleasure, for not only do I appreciate the honour, but feel there is a very great deal for us to learn from other nations. Not only in matters dealing with the care of their sick do they differ, but in most matters of individual and municipal administration of their hospital departments.

¹ Read at a meeting of the Victorian Branch of the British Medical Association on July 16, 1933.

It seemed to me, therefore, that rather than tackle the detailed problems of hospital administration, the best advantage could be made of our time by studying, first the broad basis of hospital administration, and, secondly, the principles which govern the administration of individual hospitals.

Every country in Europe regards the importance of caring for their sick very much as we in this country regard national education, and in no instance is this left to voluntary effort or charitable organizations. I do not mean that there are no such organizations, not by any means; but fundamentally the responsibility for the care of their sick rests with the State and municipalities and in no instance to voluntary aid. In England this really is now the basis of development, for although the great so-called voluntary hospitals fulfil an urgent need and are the principal medical training schools, they provide only about 15,000 beds out of the 88,000 odd now in existence for the sick poor folk of London alone.

From Finland, through all the countries of Scandinavia, Germany, Austria, Poland, Czechoslovakia, Italy, France, Belgium and Holland, the states and provinces, as also the municipalities, directly control their own hospitals, and it is not only the institutions they control, but the dispensaries and prophylactaria which form an integral part of the great network of the public health organizations.

The case in Russia is different entirely; there, medicine in all its forms is entirely nationalized, as is every other profession, and all industries as well; so except for the brief references that we must make to the fabric of these great departments, the study of their conditions is outside our scope.

It is the rule in all Continental countries that the State provides the hospital training schools. Of course, advantage is taken of the municipal hospitals as well, for this purpose, but the schools as a rule are attached to hospitals supported chiefly from State revenue.

The Director of Health is the supreme head, and with one notable exception he is a medical man. The exception is in Copenhagen where the position is held by a highly trained lay man, Mr. Nilsen. In Finland there has recently been appointed a Board of Hospital Directors comprising three doctors, two political representatives, one of whom is a woman, and a specially trained hospital architect. From the composition of this Board, its scope and activities much could be learnt of great value to ourselves. This body exercises complete jurisdiction over, and formulates the general hospital policy of the country, and all municipal activities and those of the Church, and of such societies as the German Red Cross are required to conform to the direction of this body. This applies in general principles of location and finance, but not detailed administration.

It is only natural that our hospital methods in this country should so closely follow those in England, and by no stretch of imagination could we claim

that they are adequate, nor could we claim that they are an outcome of a carefully prepared plan. The voluntary hospital system grew up in England to fulfil a need that the poor-law hospitals could not provide. Now these poor-law hospitals do not exist, for as such they were abolished by Act of Parliament in 1930, and it will not be long before the municipal hospitals provide the medical training schools and care for all classes of patients. The great voluntary hospitals such as St. Thomas's, Guy's, Saint Bartholomew's and those others which are heavily endowed will, I suppose, always be supported by other than municipal or State funds, but it is as clearly manifest in England as it has been proved in our own country, that our sick cannot be cared for by voluntary giving or voluntary service.

I feel strongly that the hospital requirements of our State and municipalities should be directed by a supreme board of control which should combine the hospital activities of the Health Department and the administrative functions of our Charities Board. The endless overlapping that now exists, the lack of co-ordination of effort and the incessant competition of our municipal institutions for essential funds from a section of the generous public—all these and many other aspects of our present system have long proclaimed the fallacies that exist in uncontrolled charitable effort, and all too frequently the misdirection of the aims of our benevolent minded people.

The problem of the individual hospital divides our subject still further into medical administration and non-medical administration. The former is concerned with all matters dealing with the patient, and the latter with all those problems of mechanics and supplies which constitute the major portion of hospital costs. In each institution, or group of institutions, there are these two distinct departments, and there is abundant evidence available to prove the advisability of having a single director in complete control.

There has been no great achievement that has not been directed by some supreme well informed authority, and no advance that has not originated from some outstanding personality in the hospital world. And so it seems that if we are to accept this experience as a guide, we must seriously consider our own methods of committee control and ask ourselves where it is we have fallen so short. Our existing method of hospital development relies chiefly on the interpretation of the committee's views of the needs of the particular institution with the aid of departmental advice from various members of the staff. This, in itself, cannot lead very far, for there is no trained director at the head of any of our institutions who has made a special study of the subject, and I can only say here that this problem is not only big enough and important enough to warrant this special study, but if we are to keep pace with the tremendous advance in the hospital world, such special study is essential and our committees and those who shoulder the

onerous burdens of hospital development should have at their command information gleaned from the four corners of the earth. Each phase should be presented to them for consideration and the pros and cons of failures and successes discussed, so that their conclusions may be built up on the experience of other nations and other ways. Money, or the lack of it, should not be the governing factor. It is better for us not to build at all than to build badly, and still better is it to postpone building rather than to spend good money to achieve inadequate or unsound results.

A comprehensive understanding of methods of hospital and departmental administration is essential before sound planning can result and consequently it has been my aim to help our committees in this direction, and in my long studies of this problem in America and the Continent to try first to understand fully the reasons for the various types of development, as it is impossible to form a sound judgement without a full knowledge of the facts that prompted them. There is a great temptation also to regard any new thought on this subject, that is, new to our way of thinking, as something suitable to that particular type of people or nationality.

I think to regard ourselves as a people apart who owing to our peculiar make-up could not be yoked with those methods of law and order which exist to such a marked extent in the general hospitalization of some nations of the Old World, is not only wrong but very handicapping to any honest endeavours of progress.

The Requirements of the Sick.

I must ask you to consider with me for a time what these great differences are, and naturally you will ask what those observations are which show such a pronounced variance in thought. My first observation, then, is that as the starting point, the best organized State and municipal hospital authorities on the Continent and in America have prepared a complete survey of the requirements of their sick. They know the approximate number of possible indigent cases, the number of lodge and insurance cases, and the number of people who would probably pay full costs of hospital care in a private institution. Think what this means—their hospitals are zoned, the bed accommodation for all classes of the community is known and duplication and overlapping of effort is avoided.

I should state clearly that in all countries except Russia, there are numbers of private hospitals under the jurisdiction of Church organizations and the Red Cross, but there are no nursing homes and private hospitals as they are known here and in England. Let us look at Holland, and how very little do we know of this wonderful little country. Amsterdam is a city the size of Melbourne, there are about 800,000 inhabitants. It is divided into seventeen districts and in each district there are two or more dispensaries according to its size. The doctors required for these dispensaries are selected by the Health Authorities and attend at the times

allotted to them for two or more hours according to conditions, and are paid from 5,000 guilders (£400 at par) a year by the Municipality for their services. At these dispensaries all patients not taken care of by insurance or lodges are examined or treated, and if they are to be sent to hospital are certified as such and a bed is allotted to them from the Central Bureau. Now there are three principal hospitals in Amsterdam, great public institutions, and five selected community hospitals, and each of these returns its bed statement each day to the Central Bureau. Without going into the ramifications of this system, let me tell you that on five separate occasions I visited this Bureau and was astonished at the completeness of the organization and the entire absence of any confusion. The State and municipal hospitals are filled first of course, and beds are taken in the other institutions as found necessary. In the dispensaries there is ample scope for those charitably minded and benevolent people who wish to serve their fellows, but think to what an extent the duplicating of effort is avoided when each dispensary has its own maternity clinic, its baby welfare centre and its mothers' aid. It takes care of the District Health Inspectors' requirements and often houses its District Relief Committee.

I might add that in most of the districts it is considered an advantage to house there also the police station and local fire brigade. It is, of course, not at all possible more than to touch on this phase of development, but it is obvious that overgrown out-patients' departments are wholly avoided in the public hospitals. A great advantage is that patients can be selected through these dispensaries for sending to the teaching institution, which is now centralized in the Wilhelmina Hospital. Here also all phases of diseases are drafted for clinical purposes.

Several countries, including Russia, have adopted this method of dispensary treatment, and of them all I think it is most interesting to realize that in California the county of Los Angeles has developed this method of caring for its two million inhabitants. It is proving a great fallacy; however, that they should have centralized their county hospital; but an understanding of the peculiar psychology of the people is necessary before one can sympathize with their desire to build a greater hospital than ever was built before, so this hospital contains 3,500 beds and the patients are brought to it from a radius of twenty miles. This is a lesson to us, for the accumulated experience in the United States of America clearly shows the need for building the hospitals in the centres of the population and the grouping of districts for the decentralizing of hospital needs.

Hospitals for Specialist Treatment.

My second observation is the development of hospitals for specialist treatment; this applies chiefly to cripples' hospitals, maternity hospitals, tuberculosis sanatoria, and cancer hospitals. I need only refer to the Rollier Clinics and Sir Henry

Gauvain's famous Hospital for Cripples at Alton in Surrey; to the German maternity hospitals; the extraordinary development of hospitals for tuberculous patients in Austria and Germany, in central Europe, and, above all, in that wonderfully organized little country of Finland. I wish it were possible to take you all over the tuberculosis hospital just completed at Paimio in Finland, with its hundred and one special details, its methods of segregation for various stages of disease, its great cantilever verandas, its fenestration, the construction of which is due to the belief in the curative value of air passing into the rooms over special herbs and plants growing in boxes between the glass sashes. In England, too, these hospitals are now being most carefully planned.

Think for a moment of the Curie Foundation in Paris and its new hospital for cancer research; the Instytut Radowego in Warsaw, planned and equipped for this purpose, so simple and effective and affording such wonderful facilities for the care of those poor wretched creatures suffering from this dreadful disease.

It would be easy to draw our lessons in economy, if in no other way, from this distinct understanding which so clearly exists, that maternity and special long stay patients are better cared for in special institutions and under doctors specially equipped for the purpose. I realize that in this I am treading on very thin ice, but in part the condition we are discussing now exists here, but, alas, only in part! It is the rule abroad to treat a few of these patients in teaching and research hospitals only, but the vast majority are cared for in special institutions built for the purpose.

Research.

My third observation is that medical research and close investigation of methods of treatment have resulted in a distinct development in planning. I do not mean in the departmental sense, such as for radium or physiotherapy, or any section of a hospital, but where it applies chiefly to hospitals built for maternity, for children, and for the care of patients with infectious diseases. The methods of construction are often expensive, but as has been proved so often to me, it is the length of bed stay of the patient that counts and not the money it costs to provide facilities for its reduction. Hence you find a distinct school of thought amongst the child specialists on the Continent, which plans to avoid all chance of cross-infection at the outset. Children are held in observation wards, 20% of the whole bed accommodation of the hospitals being so allocated in separate glass-walled wards. For dispensaries even, mothers bring their children into separate cubicles for examination, and they themselves are required to wait there while the child is being examined. If the child is to be admitted to hospital it is nursed separately until its condition is finally diagnosed; then only may the little patient be moved in a ward with other children with a similar complaint.

In Stockholm, Professor Dr. Lichtenstein has developed this theory extensively, and it would seem that his claim to have practically eliminated cross-infection in his hospital for infectious diseases is justifiable. He claims that his methods of segregating and nursing the patient in separate enclosed compartments is responsible for this. Then again we just cannot overlook the extraordinary thought given to the question of visitors in the children's hospitals. The fact that mothers may see their children only through glass screens may seem harsh to us, but its advantages seem to have been distinctly proven, that is, if reduction of bed stay and elimination of cross-infection is the outcome. I have seen so many children's hospitals in all parts of the world, and so very much more thought is given to planning for them elsewhere that I cannot but deplore the fact that our little ones who become sick have not what seem such distinct advantages that children of other lands have.

Perhaps our children do not require those extra precautions; of that I cannot judge, but have we yet thought sufficiently on those lines to weigh the benefits with the costs involved? It is to all this type of hospital development that so much is due to the medical directors. They have lived in them for years, practised in them, and have watched the progress of their patients under different conditions; that is how the changes have been effected and how such changes have been justified. I have a profound respect for the ability of these men who have given to us for the asking the results in bricks and mortar of the findings of their research. But in what way does our present system lend itself to this most desirable end?

The Cost of Modern Hospitals.

My fourth observation convinces me that modern hospitals are far more costly to build and equip than we imagine. It is not that they spend more money in other parts of the world because they have more; no, not by any means (except in America, of course), but they are more appreciative of the requirements and demand more for the treatment and needs of their patients. Their money also seems to be spent to better advantage. The results achieved in many instances clearly prove this statement, and when you see the slides I have to show I think you will agree with me on that score. All over the world one hears the fallacy of the "pavilion plan", as it is generally called, exposed. For only one hospital project did I hear such a plan discussed, and that was for the new University Hospital in Helsingfors in Finland. There it was stated that the only reason that justified it was that separate buildings could be built at a time without interfering with the rest of the hospital when money became available for building purposes. However, I understand that even this project has not been gone on with in this form.

Traditional planning on the great open courtyard and on the pavilion plan has been abandoned in favour of all forms of the block hospital type; but

it is not on planning I wish you to think, but rather the quality of materials used, the extraordinary development in fenestration and, above all, the growing desire for open air treatment. Very many hospitals built in recent years in Europe have wards on one side of the corridors only, one particular aspect being the chief consideration. Think what that means in expense of construction, let alone all the *et cetera* of equipment and fittings. Please do not think any community in England, America or the Continent is eager to spend money—far from it. The financial stringency is much more marked than here, and every nerve is strained to reduce costs; but still invariably they are higher, for science has brought hospital construction on to a different plane, where costs are balanced against an invisible gain.

At Freiburg IB., and in one or two other cities, I heard the authorities severely criticized for extravagance in their hospital development. This was very interesting, for it gave me an insight into the constant wars that are waged and criticisms that are levelled at those innovations contrasting as they do so sharply with the old institutions. Conservatism and insularity play a great part in prompting criticism of new ways and new methods, but advanced thought frequently creates new methods. Yes, greater efficiency, generally less maintenance, but almost invariably greater initial cost.

Prophylactoria.

My fifth observation for tonight is the great and increasing development of prophylactoria in Germany, Austria and in America. Prevention of disease also takes an important position in the programme of the People's Commissariat for Health in Russia. Time will not permit more than to refer to this serious problem and the consequent development of special homes and hospitals for the treatment of patients suffering from tuberculosis and such social diseases which can be detected in their initial stages. The big argument, of course, is that tremendous costs in hard cash are saved to the State if patients are treated in such homes; whereas if the disease were to develop fully, their bed stay would be indefinite, the cost of their nursing would be trebled, their earning capacity to the community would be lost and, worst of all, in the relentless progress of the disease others would become infected and brought low to share the same fate.

In most countries of the Continent, when a medical student completes his course, he is forced to decide whether he will take up private practice or enter a hospital. He generally decides to take the latter course, for it gives him greater advantages for research and keeps him in constant touch with his seniors in their special work. A professor doctor in charge of a specialist branch is the only one who may have private patients. Consequently it is the aim of most hospital doctors to have this privilege. In most institutions, first, second and third class patients are taken, the first class being

the professors' private patients. Most times he has a special department built for his exclusive use. He may have the help of his assistants in his private work, but in no instance are they permitted to have rights of practice of their own. This method is responsible in no small degree for the wonderful development of various departments of Continental hospitals. The continuity of control and direction is maintained, and it is possible to experiment with various solutions before a final scheme is decided on. The senior doctor professor is the general director of the hospital, and he has as his right-hand man a business manager on the non-medical side. Often the responsibilities are regarded on an equal plane, and the professor does not exercise a general control. This latter system is roundly condemned in Germany and Scandinavian countries, for although in many instances the system works well, it is open to very many objections.

There are outstanding instances, such as that of the great State Hospital of Frankfurt-am-Main, where a medical administrator is in complete control, as is so very often the case in America, but these instances are rare in Germany. In Switzerland they are the rule, and often I have heard opinions expressed in Germany of the advantages of trained medical administrators being given such appointments. This method is in sharp contrast with our own in this country, and I think I am safe in saying that our British so-called voluntary hospitals are the only ones which adhere to principles of control by lay committees with a secretary who has little or no jurisdiction over the administration of the other departments of the institution. Each department has its head, who is in turn responsible to the committee! I often wonder how many businesses would succeed if they were run in a like manner. However, I draw this comparison only so that we may study the non-medical side of our subject, which carries us into the realms of mechanics, food supply, equipment and personnel. It seems to me that a hospital is built around its equipment, and especially is this true in so far as the boiler house and kitchens are concerned.

Each method of food service presents an individual and particular problem of its own and which in turn requires special planning of equipment and arrangement in detail. In this department there is no particular advance in thought in England or on the Continent, except it be in the methods of handling and storage of bulk foods, and in those countries of the north where the ground is frozen for six months of the year, in their storage of potatoes and vegetables. The Americans have studied more closely all methods of administration of the food services of the hospital; they have far more efficient methods of costing, of checking waste, and have developed the labour-saving side of food preparation, food service and the economics of handling the problem than any other country. Purely from an administrative point of view the kitchen departments are handled by more highly trained persons than is the case in this country. It is a revelation to delve into the

ramifications of these departments with the dietitian in charge. It is the rule in America that these women are in charge of the whole commissariat side of the hospitals service. They are trained most carefully for their job, and it is to be very much regretted that we have not developed on these lines and have allowed the one department which could have given such a valuable lead in this respect to fall into obscurity for the lack of a fully qualified person to take control.

It is on the non-medical side of hospital administration on the Continent that one sees such an effort to economize in costs, and it is most frequently done by eliminating equipment and combining, in so far as is possible, all those expensive services which involve the provision of machinery.

Kitchen Services.

There are several instances where one kitchen serves the needs of more than one hospital, for example, in Helsingfors the Tuberculosis Hospital is supplied with food from the Fever Hospital three miles away, and this is transported in motor trucks fitted specially for the purpose. There are innumerable instances where steam is supplied to great municipal hospitals of 1,500 to 2,000 beds from the central power-generating station, and as many more smaller ones, who buy their steam for far less than they could manufacture it. I should dearly like to describe some of the boiler houses of the Continental hospitals, with their complete recording apparatus, their temperature control devices, their indicating panels, and tell-tale lights for the whole involved process of providing the mechanical needs of a modern hospital. And I should like to tell you of the great steam accumulators used at the Uleval Hospital at Oslo, and of the enormous savings of cost it was possible to effect in that instance. All this equipment and much more that I could mention adds to the cost of modern hospitals in Europe and America. These extra costs have done two things: they have provided more efficient service at less cost and have proved the necessity of combining these services wherever it is possible, so that the costs may be distributed over more than one institution. It would not be fair to draw any comparisons with our mechanical installations—so inadequate are they in most instances—the main requirements having been overlooked for their adaptability to modern hospital needs.

For many years in Paris the *Administration Publique* has created central bakeries, butter factories and buying agencies for the provisioning of its enormous public hospitals. The central buying agency for all raw food products is estimated to save hundreds of thousands of francs annually. It is very difficult indeed to obtain admittance to the inner workings of the French hospital systems, and it was only after obtaining an inkling of all these ramifications of this side of the Paris hospital organization from inspections of many of their institutions that I persisted and ultimately gained access to their internal organization.

Laundry Service.

The treatment of their laundry services is a case in point. For many years these have been grouped into districts, and the most suitable institution in each district is selected to do all the laundry work for the group. Large, dirty buildings, equipped mostly with old-fashioned machinery, but well organized and quite efficient laundries these are; the linen is not ironed, but it is mended and clean—quite good enough, I suppose, from the French point of view, where economy has always been the first consideration. But I would shudder to think of what our matrons would say were their linen delivered to them as the French matrons accept theirs. It is not necessary, however, to have such a rough finish, for in Copenhagen, where a central laundry carries out all the work for all the municipal hospitals, it is well finished, and costs, including replacements, less than three farthings per piece. I went into this aspect of economy and, like all such methods, it is open to grave objections. The Americans have adopted many of the German methods of economy on the mechanical side, but not this communal laundering system, for they demand a better finish than any such institution can provide.

Central Sterilization.

To study now the methods of central sterilization of linen for all hospital usages would, like many other subjects, be of great value to us, and I should tell you that in several of the great municipal hospitals in London this method has been in vogue for many years. Its high water mark is reached in the States, however, where enormous economies have been effected both in equipment and labour costs in installing this system and extending it to all branches of sterile supplies.

It is a great temptation also to delve into the various systems of administration and organization in out-patients' departments, dispensaries, and so on, but I feel I have covered too much ground already, and I can only thank you for your kind attention and hope that what I have said will give you some food for thought and inspiration in the tackling of our own problems.

Conclusion.

Above all, I would ask that you consider your problems from the point of view of the patient and in the light of the necessities which are demanded for his care in those institutions it is essential to create for that purpose.

THE SYNOVIAL SHEATHS AND FASCIAL SPACES OF THE HAND.¹

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IN view of Kanavel's elucidation of the course of extending infections in the hand, any intrusion into this field would be unwarranted were it not

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that there are no drawings of dissections showing the topographical anatomy of the spaces of the hand. Besides filling this want, the accompanying illustrations have the palmar creases of the hand superimposed, and so provide a ready means of assessing the surface markings of the synovial sheaths and fascial spaces.

Figure I was drawn from a hand found in the dissecting room, showing a compound ganglion. The synovial sheaths above the wrist are very distended, and it is clear that there the ulnar bursa is spreading around the sides of the *sublimis* and *profundus* tendons from behind. The close contact

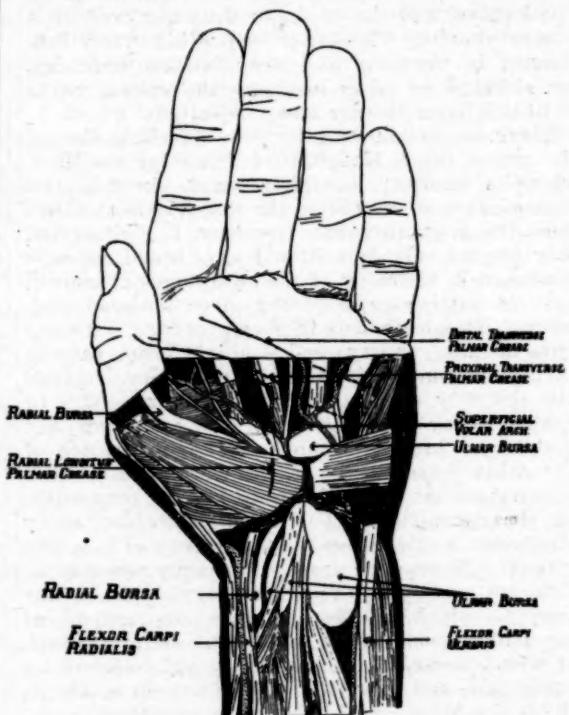


FIGURE I.
The synovial sheaths of the hand in a case of compound ganglion.

of the radial and ulnar bursae was very striking, both in the palm, in the canal of the carpus, and above the transverse ligament of the carpus, suggesting that this contact and not anatomical continuity of the sheaths is the factor of importance in extension of infection from one to the other. The figure shows that the ulnar bursa lies high up in the palm in the base of the V-shaped area between the radial longitudinal palmar crease and the proximal transverse palmar crease. The safety of the approach to the bursa through an incision to the radial side of the hypothenar muscles is apparent. Kanavel says:

The palmar portion of the ulnar bursa is opened by an incision extending from the distal flexion crease of the palm to the anterior annular ligament on the radial side

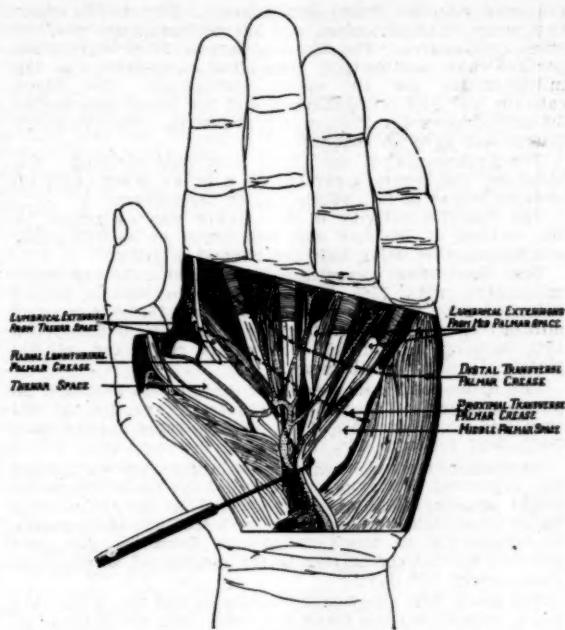


FIGURE II.
The thenar and the middle palmar spaces of the hand and their lumbrical extensions.



FIGURE III.
The middle palmar space and its lumbrical extensions. The transverse ligament of the carpus has been divided in part to expose the space more clearly.

of the hypothenar muscles (compare Figures V and I). I cut as far to the ulnar side of the sheath as possible. If there is in addition a forearm involvement I make incision about two inches long at a point one and a half inches above the tip of the ulna, cutting directly down on



FIGURE IV.
From Kanavel's "Infections of the Hand", for comparison with Figures II and III. Drawing showing the drainage under tendons. AT, adductor transversus; LS, lumbrical space; MPS, middle palmar space; TS, thenar space; UE, ulnar bursa.

the bone at its flexor surface and an artery forceps is then thrust across the flexor surface of this bone into the space under the flexor tendons. The infection will be found to have ruptured into this space in practically every case, except in the very earliest stages.



FIGURE V.
From Kanavel's "Infections of the Hand", for comparison with Figure I. Lines show area of possible incisions for infection of the tendon sheaths. In case of doubt, the free incision of the whole sheath is to be advised.

Figures II and III were made from dissections of hands injected with pigmented gelatin to show the fascial spaces. In the original of Figure II the

synovial sheath of the index finger was opened and a small trochar was passed proximally behind the tendons until it impinged on the proximal end of the sheath through which it was forced. The injection was then made, moderate pressure being used, and both the thenar and middle palmar spaces were filled, a not uncommon event. A similar technique was adopted in the hand represented in Figure III, but here the ring finger was used and as a result the middle palmar space was distended.

I quote Kanavel once more:

The least injury and the most efficient drainage of the middle palmar space can be secured by an incision along one of the three lumbrical canals leading into this space, i.e., the little finger, ring finger, or the middle finger canals (Figure III). That canal will be chosen which is already markedly infected. If the surgeon has any choice in the matter, that between the ring and middle finger gives the most satisfactory drainage. An incision is made into the canal and carried one-half inch above its end up into the palmar space, i.e., one-half inch proximal to a line joining the proximal end of the distal flexion crease with the distal end of the middle flexion crease. An artery forceps is thrust under the group of palmar tendons and the blades opened, satisfactory drainage ensuing (Figure IV).

Reports of Cases.

A CASE OF VON GIERKE'S "GLYCOGEN ACCUMULATION DISEASE".

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THE patient was first seen in July, 1932, at the age of twenty-two months. The parents were wondering why her legs were so thin and why the child was not yet walking. Also, the day before, she had had four loose, foul-smelling motions.

On examination the child was healthy looking and appeared well nourished, but the legs were comparatively undeveloped, and a condition of *talipes valgus* and *genu valgum* was present. Movement was free in all directions, although the child could not support herself in the erect position.

The abdomen was greatly enlarged, due to increase in size of the liver. The spleen was not palpable at this or subsequent examinations. The liver enlargement was uniform, the thin lower edge and the notch between the lobes being easily palpable. In the mid-line the lower border was one finger's breadth below the umbilicus, and the left lobe reached beyond the lateral plane. There was no pain or tenderness whatever, and no jaundice was present. The urine contained no albumin, sugar, bile or pus.

In the previous history there was little to note. The child has been under observation since birth. At birth the presentation was a right occipito-posterior one and the child had to be turned and delivered with forceps.

She was seen at the age of ten months with a mild enteritis, which settled down in twenty-four hours. No enlargement of the liver was noticed on palpation at this time.

She was fully investigated in July, 1932, and the following results were obtained: The Wassermann test gave no reaction. The fasting blood sugar was 100 milli-

grammes per 100 cubic centimetres. The blood sugar two hours after breakfast was 124 milligrammes per 100 cubic centimetres. The blood urea was 22 milligrammes per 100 cubic centimetres. The blood cholesterol was 126 milligrammes per 100 cubic centimetres. The blood calcium was 12.4 milligrammes and the blood phosphorus 3.3 milligrammes per 100 cubic centimetres. The Van den Bergh test gave no reaction.

The appearance of the blood was very striking. On standing, the serum separated in a milky layer, with an obvious excess of fat, which rose to the surface.

The lipolytic activity of the serum was estimated by the method of Whipple and was found to be 0.62 cubic centimetre, this being half the normal activity.

The blood count revealed 3,700,000 red cells per cubic millimetre, with 75% haemoglobin value and a colour index of 1.0. The leucocytes numbered 15,300 per cubic millimetre, with 22% neutrophile cells, 66% lymphocytes, 10% monocytes, and 3% eosinophile cells, and 263,000 platelets per cubic millimetre.

The urine contained a trace of acetone, no albumin, no pus, no sugar. The patient was on a low diet at the time and an estimation of fat in the stools showed only 7.9% total fat with 90% split.

No diagnosis could be made at this time, but an opinion was expressed that evidence of one of the blood dyscrasias might appear later. It was decided to keep the child under observation, to treat her with iron for the anaemia, to remove fat as much as possible from the diet, and she was given liver extract to the amount of 30 grammes (one ounce) per day.

For about five months the condition did not alter very much, except that the lipæmia disappeared. On October 11, 1932, the lipolytic activity test revealed a figure of 0.53 cubic centimetre, and the appearance of the serum was noted as "opalescent". At another test on December 13, 1932, the reading was 0.35 cubic centimetre, and on February 14, 1933, it was 0.29 cubic centimetre.

During this time the blood count had varied a little, the leucocytosis abating to 11,700 per cubic millimetre, haemoglobin to 63%, and red cells to 3,370,000 per cubic millimetre.

The liver varied slightly in size; one month it would be 2.5 centimetres (one inch) below the umbilicus, then it would recede to the level of the umbilicus.

In February, 1933, the mother stated that the child had commenced taking "turns". When she was seen on recovering from an attack, the condition resembled a mild epileptiform seizure. Attacks always occurred between five and six o'clock in the morning. On testing the urine, acetone was present, and on following this up with examination of the afternoon specimen, none was found.

Further blood sugar estimations were now carried out and the child gave fasting values of 0.056 milligrammes per 100 cubic centimetres with a rise to only 0.088 milligramme two hours after taking 120 cubic centimetres (four ounces) of sweetened milk.

The lipæmia had not recurred. On feeding the child with an abundance of glucose at night and during the day the seizures disappeared. On one occasion when the child woke early in the morning with a cry, glucose was immediately given and the seizure did not take place. About this time she had an attack of measles, which cleared up without complications.

In the presence of these signs and symptoms, namely, uniform and non-painful enlargement of the liver, absence of enlarged spleen and jaundice, ketonuria in the presence of hypoglycæmia, there was justification for the diagnosis of von Gierke's disease.

Comment.

The condition is a rare one, only four previous cases being reported. No diagnosis had been made in the present case until Worster Drought reported his case in *The British Medical Journal* of March 11, 1933, with reference to three other cases. His patient was a girl who came under observation at the age of ten years, and in 1932 was alive and healthy, aged twenty-two years. Her symptoms were similar in many ways to those of the

present patient: hepatomegaly, ketonuria, hypoglycaemia. No lipæmia was reported in this case. Acetone was still present in the urine at the age of twenty-two years.

The other three cases reported are:

Case I.—The patient was a girl of eight years with enlarged liver of unknown origin. She died of influenza in 1928; and von Gierke performed a *post mortem* examination and found that the condition was due to an accumulation of glycogen in the liver. There was no splenomegaly. In this case Dr. Schomheimer found an absence of the glycogen-splitting ferment present in the normal liver.

Case II.—The patient was a boy, aged four years and ten months, who died of pneumonia. A similar condition was found to that in Case I.

Case III was reported by Dr. E. Bellingham Smith and Dr. Elizabeth O'Flynn in *The Lancet* of February 11, 1933. The patient had been regarded as suffering from "familial hepatomegaly of uncertain pathology". He also suffered from chronic pulmonary fibrosis and bronchiectasis, and "whilst coughing was seized with violent abdominal pain and fatal collapse followed". After *post mortem* examination the condition was regarded as being of the same type as von Gierke's original case. Whether the liver was ruptured is not stated.

Theories as to the causes of the symptoms may be summarized as follows:

1. Hepatomegaly. Glycogen retention due to the absence of the normal glycogen-splitting ferment in the liver.

2. Glycogen being retained, sugar is not available for complete combustion of fats, and ketonuria results.

3. Lipæmia. It is stated by Pavy that portion of the glycogen of the liver is converted into fat. If so, although the retained glycogen is not converted into sugar, it may appear as an overflow of fat in the blood which cannot be absorbed.

4. Steatorrhœa. On one occasion the patient had 38% total fat in the stools, the majority of which was split fat. This diminished absorption may be due to a diminished flow of bile. The liver cells, when the bile is secreted, are spheroidal cells, but owing to mutual pressure appear polygonal. This pressure must be much greater when the cells are distended with glycogen. The bile capillaries lie between these cells and must suffer from this increased pressure, so that it is possible that the flow of bile to the intestine is less than normal, making possible a diminished absorption of fat.

5. Epileptiform seizures. These attacks are accompanied by hypoglycaemia and ketonuria. It has been shown that diabetic patients taking an excess of insulin get a condition which, while not epileptiform, nevertheless is due to a definite effect on the nervous system, and this convolution in a child of three may be comparable. It may be also noted here that Worster Drought's patient suffered from fits between the age of one and four years. The fact that the seizures occurred early in the morning may be accounted for by the fact that this is the period when the normal blood sugar is at its lowest and the possibility of ketonuria greatest. The relief of the condition by the administration of glucose raises a very puzzling point, namely, that while the glycogen in the liver cannot be split up, yet the glucose administered must pass through the liver to overcome the ketosis.

Is there some chemical difference between the glucose given medicinally and the glucose formed from the breaking down of glycogen?

Conclusions.

The condition is one commencing in the first decade with hepatomegaly, ketonuria and hypoglycaemia, with a tendency to recovery. In the four cases reported, one patient died of influenza, one of pneumonia, one from indirect trauma to the liver by the strain of coughing, and the fourth is alive and well.

The present patient is alive and well at the present time and has begun to walk. What will happen to her in the future only time can say.

Acknowledgements.

Acknowledgements are due to Dr. R. B. Wade, under whose care the child was during her stay in the private division of the Royal Alexandra Hospital for Children.

Reviews.

CHILDBIRTH AS NATURE WOULD HAVE IT.

ALL who practise obstetrics should read "Natural Childbirth", by Grantly Dick Read.¹ In a foreword, the author contends that interference in midwifery is still the chief reason for the failure of any substantial reduction in our maternal mortality, and very rightly admits that such interference, whether by instruments or by anaesthetics, is mostly directed to save pain and suffering, neither of which Mother Nature intended to accompany parturition. Thus a close investigation into the nature and origin of pain in labour is demanded.

The anatomy and physiology of the parturient uterus is first described, and the great influence of the action of the sympathetic division of the autonomic nervous system on this latter system is shown, synergic action occurring only when the sympathetic is inhibited or controlled. This insures coordination and integrity of the neuro-muscular action of the uterus in labour. The writer then states that the extraordinary influence of the psychology of the modern woman of culture is the outstanding factor in the production, in labour, of pain. Psychologically at this time such a woman is the victim of fear and terror, the creation of racial experience, ignorance and hearsay. As a result, a flooding of sympathetic stimuli causes firstly inhibition and secondly pathological tension, and thus such pain as was primarily merely subjective now becomes real and objective. A comparison of the painless labours of the most primitive peoples of today in contrast to the painful and often agonizing labours of the civilized and cultured races lays the foundation for the contention that the alteration in the sequence of the emotions as the result of culture, temperament and environment, is the sympathetic stimulus which upsets the neuro-muscular action and results in pain. The author describes his observations of a native woman during labour in respect to the psychological reactions and interactions thus: "Elation, wonder, tenderness, and the pride of creation appeared to combine in a great storm of pleasing emotions and from their influence the birth of a child had been perfected."

Thus the writer is convinced that the type of labour is controlled by the emotions, which, in their turn, are qualified by the temperament. The whole process of labour has been carefully analysed, not only anatomically and physiologically, but also from a point of view of what is now of equal importance, psychologically; and an interesting and beautiful study has been made. As a result, a definition of natural labour can be deduced: "The perfect labour is the painless labour without anaesthesia, carried out by natural processes from beginning to end, influenced by natural emotions and perfected by the harmony of the mechanism."

In order to apply such to practice, Dr. Read emphasizes the influence of mind over matter, and stresses the importance of both suggestion and psychoanalysis during the long ante-natal period, and which must continue and even be intensified during the actual conduct of labour.

The value of drugs, such as morphine and of anaesthetics, such as chloroform, is fully admitted in certain cases, and their action is very logically explained on the basis of the thesis. The book concludes with an excellent chapter devoted to midwives. The author very rightly explains

¹ "Natural Childbirth", by G. D. Read, M.A., M.D.; 1933. London: William Heinemann (Medical Books) Limited. Demy Svo., pp. 136. Price: 7s. 6d. net.

the influence of the personal factor in dispelling fear, causing misunderstanding, inviting faith and confidence, and in general promoting all that stands for peace, relaxation and the urge to succeed.

The book contains only 127 pages, and includes ten chapters and an index. There is a wealth of information, together with original and beautiful thought and psychological research, all admirably expressed. The high ideals of obstetrics held by the author deserve great merit.

THE ENDOCRINES.

WISE indeed is he who knows the limit of his knowledge. Such may be said of Ivo Geike Cobb who, in his recent edition, the fourth, of "The Organs of Internal Secretion", has no hesitation in stating the limitation of his, and thus necessarily our, knowledge of the subject of endocrinology.¹ This candour is appreciated and following the extravagant claims which have been made for glandular therapy, it is refreshing to read the plain statements of facts as marshalled together in this volume. The amount of data collected and classified is a tribute to the author's keenness and his insistence upon accuracy of detail. The edition has practically been rewritten and brought up to date. A chapter on obesity has been added, in which the author has wisely confined himself to principles of treatment without advising, as is so usual, some particular list of dietary. That the cause of obesity may be the failure of some internal secretion will bear emphasis at the present time when so much faith is pinned to the restriction or alteration of diet as the treatment of this affliction.

The chapter devoted to the thyroid and parathyreoid glands is well written and easily read, but a word or two on the medical preparation of the toxic goitre subject for surgical operation, with reasons, would not be amiss in such a work.

A study of the discussion of the part played by internal secretions in digestion will repay the time and trouble devoted to it, and this chapter might well be inserted in standard works on gastric disorders.

The antagonism between glycogen storage and fat deposition in the liver as outlined in the chapter on the functions of the pancreas clearly opens up the way to the modern high carbohydrate-low fat diet for diabetics. Mention is made of the circulatory hormone of the pancreas, only to make it clear that little is known of its value or uses.

The chapters mentioned demand only a straightforward medical understanding, but the study of the internal secretions of the gonads leads us into bypaths and vicious circles from which there seems to be no exit, and only an author with a grip of his subject could steer so easily readable a path.

The gonads, their internal secretions and the close relationship between the nervous system, nervous control, temperament and internal secretions, necessitate a study of an intense degree if progress is to be made. A deficiency of secretion or an excessive action of any one gland can produce so marked a metabolic change in the whole organism that the original defect may be lost sight of. This renders the whole subject such a complex one that conclusions can be reached only after much investigation. The author realizes this throughout the volume, and this enhances its value.

A list of all the preparations of endocrine glands is included. Each is described as to contents, dosage and uses. The edition is one in which every physician will find profit.

¹ "The Organs of Internal Secretion: Their Diseases and Therapeutical Application, With a Chapter on Obesity and its Treatment" by I. G. Cobb, M.D., M.R.C.S.; Fourth Edition: 1933. London: Baillière, Tindall and Cox. Demy 8vo, pp. 316. Price: 10s. 6d. net.

THE COMMON COLD.

DAVID AND ROBERT THOMSON have added another monumental volume¹ to the "Annals of the Pickett-Thomson Research Laboratory". These volumes are usually well printed and elaborately illustrated by photomicrographs, and the cost of publication is such that this Research Laboratory loses, on the average, £400 yearly on this item alone. The authors' objective in this volume, which is one of the best in the series, has been to summarize the literature on the "common cold", and they have added their own experiences and opinions. The amount of labour involved may be judged from the thirty-nine large pages devoted to bibliography, and the authors state that they have extracted information from about two thousand research papers. "Very few people to-day realize that there are at least 50,000 research papers published every year on biological problems." "Twenty-five years ago a professor of bacteriology knew practically everything that was known about his own science. How very different it is to-day." The Thomsons have by "constant and diligent labour" collected nearly 500,000 original papers and abstracts classified under about 10,000 headings.

The text begins with about thirty pages on the anatomy and physiology of the nose and accessory sinuses, and further fifty pages on the normal flora of the nose, throat and mouth. It is disappointing that we have not more final information as to the antibacterial mechanisms in the secretions and mucous membranes of these all-important gateways to internal systems. The flora of the nose and sinuses, naso-pharynx and mouth show remarkable quantitative differences, but the factors underlying these adaptations do not seem to have been sufficiently evaluated.

The authors consider that from the point of view of aetiology the common cold is not a single disease, but an infection of the upper respiratory tract by a number of very different microbial species, the most common being the pneumococci, Pfeiffer's influenza bacillus (*Haemophilus influenzae*), *Micrococcus catarrhalis* (*Neisseria catarrhalis*) and haemolytic and non-haemolytic streptococci. They admit also the filtrable virus of the common cold first reported by W. Kruse in 1914 and extensively studied by Dochez and others recently. They are confident, however, that the bacterial pathogens above mentioned are primary agents and do not need a filtrable virus to initiate the infection. The virus is only another pathogen added to the list. Though they admit that cultures may be "negative" on the first or second day in some common colds, yet in others they have found pathogenic bacteria in large numbers from the onset. Varieties less commonly associated with a common cold are Friedländer's bacillus and the staphylococci, and there is a chapter on anaerobic species. They are rather sceptical as to the part played by diphtheroid bacilli of the type *Bacillus septus* (*Bacillus coryzae segmentosus*).

There are chapters devoted to the part played by chilling of mucous membranes, diet and clothing, and also chapters on predisposition, complications, sequelae and sinus infections. A large amount of space is devoted to treatment, prophylactic, abortive, local and general. Antivirus and bacteriophage are apparently not "invariably magical". They are advocates of vaccines both for prevention and treatment. Direct cultures are made from the nose and naso-pharynx on to blood-containing media. They prefer their own inactivated whole blood medium to Warren Crowe's medium. Many of the primary cultures that interest them are photographed and a considerable selection are reproduced. Altogether this comprehensive survey of the literature is a valuable reference volume for libraries and schools, but is rather beyond the means of impecunious bacteriologists. It can be recommended, however, for the private library of a rhinologist.

¹ "The Common Cold", by D. and R. Thomson, "Annals of the Pickett-Thomson Research Laboratory", Vol. 8, Dec. 1932. Baillière, Tindall and Cox, London. Pp. 699, 51 full-page plates. Price £3 3s.

The Medical Journal of Australia

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TUBERCULOUS BACILLÆMIA.

ACCORDING to accepted teaching, tuberculosis spreads from a primary or secondary focus either by the lymph stream, the blood stream or along continuous surfaces. The spread of the tubercle bacillus (*Mycobacterium tuberculosis*) by the lymph stream is the earliest method of spread and occurs oftener in children than in adults. The bacilli may gain entrance to the blood stream either by the thoracic duct or by direct eruption into a vessel from a tuberculous focus. Spread by continuity is seen in many parts of the body, the most common example being the spread of ulcerative pulmonary tuberculosis. A search for tubercle bacilli in sputum or in urine is often made for purposes of diagnosis; and when reasonable care is used in the technique the results may be regarded as reliable. There are, of course, pitfalls which must be avoided. The detection of tubercle bacilli in the blood has been reported over and over again, and the reports have extended over many years. The difficulty of isolating the causative organism of any blood infection is well known; and he who would use this method of diagnosis must adopt a technique known to be satisfactory and must apply it with meticulous care. It would be reasonable to assume that isolation from the blood of infective microorganisms would be easier in an acute

pyogenic septicæmia or in an acute miliary tuberculosis than in a mild or chronic tuberculous infection. The experience of most bacteriologists justifies this assumption. During recent years, however, some workers have held that tuberculous bacillæmia is extraordinarily frequent and may be demonstrated in mild and in latent as well as in advanced and miliary tuberculosis. Prominent among these is Löwenstein, who has been writing on this subject since 1905. Löwenstein's claims have been so divergent from those of other workers, and even of those who have studied with him, that the Medical Research Council has, on the recommendation of the Tuberculosis Committee, appointed jointly by itself and the Agricultural Research Council, published an extensive review of the subject.¹ The report is the work of Dr. G. S. Wilson, of the Division of Bacteriology and Immunology of the London School of Hygiene and Tropical Medicine.

Dr. Wilson first of all draws attention to the discrepancies in the results obtained by different workers in regard to tuberculous infections, and he also points out that claims have been made for the isolation of tubercle bacilli in a high proportion of patients suffering from non-tuberculous diseases and of perfectly healthy persons. The technique employed by these workers is open to two main sources of error: confusion due to artefacts which may be to some extent acid-fast, and confusion caused by contamination of the preparations with saprophytic acid-fast bacilli. Further, Dr. Wilson regards it as not unlikely that the results of certain workers are vitiated by their failure to take such elementary precautions as: (a) the use of new slides, (b) protection of the cedar wood oil used for immersion lenses from contamination with acid-fast bacilli carried back into the reservoir by a rod that has been allowed to touch a positive preparation, and (c) cleansing the nose-piece of the objective after the examination of every preparation containing acid-fast bacilli. He concludes that the recognition of the tubercle bacillus on morphological grounds alone is impossible and that little

¹ "Tuberculous Bacillæmia", by G. S. Wilson, with appendices and notes by Herta Schwabacher, C. C. Okell and E. A. Wood. Medical Research Council of the Privy Council, Special Report Series, Number 182. London: His Majesty's Stationery Office. Price: 2s. 6d. net.

or no attention can be paid to the results of microscopical examination of the blood for the detection of the bacillus. Dr. Wilson also discusses the varying results obtained by those who have tried to demonstrate the presence of tubercle bacilli in the blood by the guinea-pig inoculation method. In his opinion the discrepancies are due to the fact that many workers have diagnosed inoculation tuberculosis in guinea-pigs on wholly insufficient grounds. Some workers have diagnosed tuberculosis in the complete absence of macroscopical lesions; they have relied on the result of the tuberculin test, on the demonstration of acid-fast bacilli in the blood or viscera, or on the finding of giant cells of the Langerhans type in sections of tissue. Others have been misled by spontaneous tuberculosis, pseudotuberculosis and so forth. Dr. Wilson concludes from a critical examination of the figures that genuine tubercle bacilli have been demonstrated in the blood in about 4.9% of patients with severe pulmonary tuberculosis, in about 36.4% of patients with miliary or meningeal tuberculosis, and in about 2.7% of patients with non-pulmonary tuberculosis.

Turning to Löwenstein's results, Dr. Wilson points out that there is considerable difficulty in forming any complete picture of what Löwenstein has actually done. When Löwenstein reports the same series of cases in different journals, the figures do not always agree; and the figures in the text of an article are sometimes at variance with those in the accompanying table. As far as Dr. Wilson can gather, Löwenstein claims to have isolated tubercle bacilli from the blood stream during life of about 40% of patients with pulmonary tuberculosis in all stages, from 100% of patients with pulmonary tuberculosis in Stage III, from 80% to 100% of patients with miliary, meningeal or intestinal tuberculosis, and from 40% to 60% of patients with laryngeal, renal, skin or surgical tuberculosis. He also claims to have demonstrated by culture the presence of a tuberculous bacillæmia in 67% of patients with articular rheumatism and polyarthritis, and in about 50% of patients with various diseases of the nervous system. Dr. Wilson discusses critically Löwenstein's results and the

criteria relied upon for the identification of the tubercle bacillus. This discussion cannot be reproduced here, nor is it necessary that it should be reproduced. Dr. Wilson states that workers who have studied under Löwenstein have been unable to reproduce his results, and that, while in Löwenstein's laboratory, these workers have not seen the results that are claimed by Löwenstein. He concludes that the unqualified reception by scientific workers of the results claimed by Löwenstein cannot be seriously entertained.

The first question that the careful reader of this report asks himself is whether Löwenstein's work is worth all the powder and shot that have been expended on it. Publications of this kind, however, are necessary. Error must be exposed. After the prominence given to his work by the Medical Research Council of Great Britain, Löwenstein will doubtless make some reply. He will certainly check his methods and will, it is to be hoped, make a communication embodying later results. In this account of the report no mention has been made of the wealth of technical detail contained in it. All those who examine supposedly tuberculous material can learn something from this report. Reference to the subject in these pages will not have been in vain if medical practitioners realize the need for attention to detail in bacteriological technique and for accuracy in reporting their findings.

Current Comment.

SYRINGOMYELIA.

ELONGATED cavities in the spinal cord have been termed syringomyelia and hydromyelia. The latter were supposed to be analogous to hydrocephalus and have liquid contents. In syringomyelia the cavity is tubular and usually situated in the cervical and upper dorsal areas behind the commissure. It may extend for some inches and may be divided into two at various points of its length. In some instances it would seem to be a dilatation of the central canal, but in others the normal central canal can be seen in addition to the cavity. Around the cavity may be dense fibroid tissue, external to which is embryonic neuroglial tissue. Gliomatous or sarcomatous structures have been described. Probably the neuroglial tissues and the cavities also at times are congenital. Such cavities have been found in young children associated with hydrocephalus. Sir Frederick

Taylor suggested that the cavities might be due to inadequate filling up of the posterior part of the cavity which is formed from the primitive groove, and around this cavity the embryonic tissue persists. In later life the neuroglial or gliomatous tissue increases with enlargement of the cavity. The symptoms may be bewildering or may not be apparent, and the condition may be discovered only at autopsy. Dissociation of sensation is typical. Sensation to touch, muscular sense and the special senses may be intact, while pain and thermal sensations may be lost. Trophic disturbances with bullæ, ulcers and oedema of the fingers occur, and muscular atrophy, chiefly implicating the upper limbs, with *main en griffe* is seen. The bladder and rectum are not often involved. The lesions rarely spread to the medulla and pons. Diagnosis has to be made from multiple neuritis and progressive muscular atrophy. Müller's microscope for the observation of skin capillaries shows that in syringomyelia the cutaneous vascular supply is abnormally rich and the blood vessels are unusually visible, displaying a greater degree of filling, especially where the innervation is altered.

Roma Amyot¹ reports in detail five cases of syringomyelia and stresses the importance of sympathetic implication in this disease. During the initial period there may not be the same manifestations as are apparent later. Even in the established disease typical signs may be lacking or unusual signs may be present. During the early stages of a slowly progressing glioma the signs may be very puzzling. Although the initial localization is generally cervico-thoracic, this is not invariable, and the gliomatous cavitation may start in the lumbar area or in the medulla. Symptoms may remain unilateral for a long time. Muscular atrophy may be discrete and wasting may not progress. The first manifestations are usually subjective sensory changes, pains and dysæsthesias, gradually replaced by analgesia. Vasomotor, sudorific and trophic disturbances are rarely absent and are of as great value in diagnosis as muscular atrophy and sensory dissociation. Diagnosis is based on brachial localization, on the slowly progressive evolution, on the radicular sensory dissociation, and on the peripheral motor changes. Amyot insists that the sympathetic troubles are part of the symptom complex and that such troubles should have the same diagnostic value as the symptoms produced by lesions of the lower motor and sensory neurones. The evolution of syringomyelia is often amazing. The lesions spread, irritating and destroying the cord's components with capricious electivity in the early stages and creating variable and dissociated symptoms. Subjective sensory phenomena may be prominent or may be absent, while muscular atrophy is gross. Again, sympathetic disturbances may prevail, but such are rarely complete and mostly exhibit dissociation. Vasomotor troubles may alone be present; or pilomotor or sudorific

signs may predominate. This dissociation demonstrates the fineness of the syringomyelic process, which can produce a splitting within the sympathetic functions whose medullary centres and tracts are so intimately grouped. Vasomotor disturbances may create symptoms comparable with causalgia or erythromelalgia. The pains of syringomyelia may be dysæsthesias or genuine pains. Such sensory phenomena are due to irritation of sensory fibres of the cord, which may also cause burning pains. In these circumstances such result, wholly or in part, arises from peripheral circulatory changes—vasomotor and especially vasodilator. Amyot believes that vasomotor dysfunction leads to such trophic troubles as arthropathies and palmar and plantar retractions like Dupuytren's disease. Kyphoscoliosis may be seen early in syringomyelia. But the deviation resulting from muscular weakness must be distinguished from that occurring after vertebral arthritis. One of Amyot's patients had persistent galactorrhœa and two similar cases have been reported by other observers. Amyot states that it is not officially accepted that the nervous system has a direct action on the secretion of milk, but that, in view of these cases, certain lesions of the cord involving its vegetative centres, as in syringomyelia, may produce persistent galactorrhœa. But surely it must be admitted that secretion of milk is influenced by the nervous system. It is a commonplace observation that mental emotions, such as fright, anger or grief, may profoundly alter the quantity and even the quality of the milk. The nervous system may act either through the vasomotor nerves determining the blood supply or by a more direct trophic influence exerted on the secreting cells. The nervous influence on secretion may be disturbed by causes acting on the nervous centres or on the nerves going to the mamma or by reflex action upon the nerves of other parts. Amyot observes that rotary nystagmus, alone or with other bulbar symptoms, indicates extension of a cervical syringomyelia to the medulla. In one of the cases here reported lumbar puncture showed partial blocking. Lipiodol injected into the cisterna did not descend, and, injected after lumbar puncture, showed a partial stop at the sixth thoracic vertebra, where it travelled along two irregular pathways. Amyot draws attention to some aspects of syringomyelia shown by upper or lower limb signs, with slow and insidious evolution and evidenced for a long time solely by pain. Such aspects may lead to errors because we are dealing with a definite localization of the pain, because the painful sensation is increased by active movements of the limb and by pressure over the aching area, and because of an adjacent swelling, as if we were dealing with an external lesion exclusive of the cord. If, after repeated and detailed neurological examination, sensory, motor and sympathetic signs are found, a medullary and syringomyelic lesion should most often be diagnosed. Amyot makes a noteworthy contribution to a bewildering subject.

¹ The Canadian Medical Association Journal, July, 1933.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Myasthenia Gravis.

H. EDGEWORTH (*The Journal of the American Medical Association*, May 6, 1933) reports the results of treatment in a case of *myasthenia gravis* by the ingestion of ephedrine sulphate. A daily dose of 48 milligrammes (six-eighths of a grain) of ephedrine sulphate or hydrochloride was accompanied by slow but continuous improvement. The smallest dose which would produce an effect was used as a routine measure, and on occasions when fatigue might be anticipated an occasional larger dose was taken. The daily dose of approximately 48 milligrammes has now been taken for three years without ill effect. Reference is made to the use of glycine in *myasthenia gravis*, but no report on this substance is included.

The Function and Clinical Use of Cortin.

F. A. HARTMAN (*Annals of Internal Medicine*, July, 1933) has studied the effects of cortin in cases of Addison's disease. Beneficial action was apparent within a few hours and the recovery stage usually reached within three days. Experiments were also conducted on animals from which the suprarenal capsules had been removed to study the effects of fatigue on nerve-muscle preparations and the result of cortin treatment. Markedly favourable effects were noted on nervous, muscular and circulatory asthenia, on gastro-intestinal instability, renal insufficiency and decreased metabolism by timely treatment with cortin. Cortin is essential for growth and in its absence there is a decreased resistance to toxins. It also has some function in the utilization of vitamins, particularly vitamin C, and has an intimate connexion with the gonads. Clinically it may be used without harm in the treatment of any asthenia for which no cause can be found. No one has been able to show any deleterious effects in the organism from the use of cortin. It is only when extracts are crude or toxic that particular care must be taken. It is best to give injections once or twice daily for a week or two and then discontinue treatment. Dosage can be determined only by trial, but three to ten cubic centimetres *per diem* of a potent extract should give a positive result in any but severe cases, especially if the treatment be continued for four or five days.

Addisin.

R. S. MORRIS *et alii* (*The Annals of Internal Medicine*, June, 1933) describe observations on addisin in diseases of the blood. Addisin is a haemopoietic substance secreted by the normal

stomach in man, swine, dogs and cattle; this substance can be concentrated in various ways and gives a prompt haemopoietic response after intramuscular injection into a patient with pernicious anaemia. One unit of addisin is the amount recovered from 100 cubic centimetres of original gastric contents. A dose of nine units produces a haematological response in pernicious anaemia. The best response followed doses of 30 to 60 units; this produced a prompt reticulocytosis of 24 days' duration, and in 64 to 100 days the red count rose from 1.4 to 4.5 million, and the haemoglobin from 44% to 93%. Five patients were treated with concentrated human gastric juice and eleven with concentrated swine gastric contents. Intramuscular use produced little local or general reaction, but intravenous injection caused symptoms of shock and was considered dangerous. Before intramuscular injection it was important to be sure that the needle had not entered a vein. In erythema it is suggested that there may be a hypersecretion of addisin in the stomach. In one patient treated by gastric aspiration and lavage three or four times a week the red count steadily decreased from 10 million to 5.3 million; when lavage was discontinued the count rose again to 10 million in a few months. This result somewhat supports the above view. In acholuric jaundice injection of addisin reduced the reticulocyte percentage in the blood, possibly by its effect on the bone marrow in establishing more normal maturation of the red cells. In agranulocytic angina (one case) a marked leucocytic response was noted within twenty-four hours of the injection of thirty units of addisin; rapid clinical improvement occurred also.

Action of Cobra Venom in Mouse Cancer.

A. CALMETTE, A. SAENZ AND L. COSTIL (*La Presse Médicale*, August 23, 1933) state that cobra venom has an indubitably curative effect on adenocarcinoma of the mouse, whether engrafted or spontaneous. Injected into the tumour in repeated deci-lethal doses it produces a melting away of the adenocarcinomatous tissue and its elimination or absorption in fifteen to twenty days. These observations have been rigorously checked by experiment. The authors recall other work which showed that cobra venom is a diastase which acts chiefly on the lecithin of egg yolk or of serum and on cellular nucleides. In acting on lecithin the venom produces an anhydride of the palmitophosphoglyceric ether of choline. This substance has an instantaneous haemolytic effect on all blood. It is a cytolsin which destroys leucocytes, epithelial cells, and the cells of different tissues and organs. *In vitro* it acts on hepatic, cerebral and renal cells, and if the dose be sufficient, it dissolves them. The authors do not draw the deduction that what cured the adenocarcinoma of the mouse will

cure human cancer also. But they suggest that possibly this toxic diastatic product which is elaborated by the salivary glands of certain venomous reptiles, may prove to be a valuable auxiliary of surgery, radium and the Röntgen rays in anti-cancer therapy.

Histamine Treatment of Painful Muscle and Joint Affections.

ALEXANDER FABER (*Münchener Medizinische Wochenschrift*, August 11, 1933) discusses the value of histamine in the treatment of painful affections of muscles, nerves and joints. The histamine effect is to increase the circulation in the capillaries and small arterioles, as does any counter-irritant. The author has used histamine for six months in a large and varied series of patients at the Heidelberg Orthopaedic Clinic, the conditions including acute and chronic myalgia, sciatica, acute and chronic arthralgia, post-traumatic and post-operative disabilities, and localized circulatory disorders. The preparation most used was "Imadyl-Roche", a histamine ointment prepared by the Hoffmann-La Roche Company. About one cubic centimetre of this was rubbed in after light scarification of the skin. The best results were obtained in chronic and acute myalgia (mostly of the back or the shoulder) and in acute arthralgia. Chronic joint affections gave disappointing results, and in sciatica the result was only sometimes satisfactory. Post-operative and post-traumatic circulatory disturbances in the limbs were materially benefited. With these limitations the author sees in histamine a valuable auxiliary of the treatments hitherto in vogue.

Strychnine Poisoning.

S. STALBERG AND H. S. DAVIDSON (*The Journal of the American Medical Association*, July 8, 1933) report the successful treatment of an unusual case of strychnine poisoning by the intravenous injection of "Sodium amyalt" supplemented by tribromethanol anaesthesia. The amount of strychnine was about 0.11 grammes and was contained in sugar-coated pills. The patient was a woman of thirty, weighing 105 pounds, and the poison was swallowed accidentally while she was in a motor car. She had a light breakfast half an hour previously. Minor symptoms of restlessness, nervousness and stiffness of the neck appeared after fifteen minutes. She lost control of the motor car, which ran into a tree, and she was arrested on a charge of being drunk. She was admitted to hospital, where she was given apomorphine, chloral, bromide and tannic acid. She was seen in her own home by Stalberg five hours after swallowing the pills, and emesis was again induced and morphine was injected hypodermically. She continued to have severe pain in the neck and back and was put on chloral and bromide every three or four hours. Forty-nine hours after taking the strychnine she had a con-

vulsion, and another, more severe, three hours later. Inhalations of amyl nitrite and ether had no effect. An intravenous injection of "Sodium amyta" was then given, which produced immediately a deep sleep and she was removed to hospital. During the next five and a half days she had fifteen more convulsions and received five intravenous injections of "Sodium amyta". These were later supplemented by tribrom-ethanol 0.26 grammes in 175 cubic centimetres *per rectum*. The "Sodium amyta" stopped the convulsions at once and produced narcosis lasting from six to ten hours when given intravenously. Administered by mouth it had no appreciable effect. Two of the injections given the same evening caused a definite degree of collapse next morning, which was treated by atropine and "Coramine" given hypodermically. The tribrom-ethanol injections were followed by sleep within a few minutes, which lasted from five to nine hours. The sleep, however, was more restless than after the "Amyta" injections, but caused no untoward effects. After "Amyta" the patient remained free from convulsions for several hours after wakening. After tribrom-ethanol convulsions reappeared within a much shorter time after the patient wakened. Inhalations of amyl nitrite, ether and chloroform were of no value in stopping the convulsions. Morphine was without effect and might tend to augment the convulsions.

NEUROLOGY AND PSYCHIATRY.

Familial Myoclonia.

F. G. LINDEMULDER (*Journal of Nervous and Mental Diseases*, May, 1933) reports in detail a case of myoclonia in a youth of seventeen years, exhibiting twitchings and jerking movements of the face, arms, neck and legs. No abnormality was found on a searching neurological examination, nor was there any abnormality detected in the other systems, the blood, urine, cerebro-spinal fluid or basal metabolic rate. The illness began at the age of thirteen, and though all the movements were increased under pressure of excitement and in the presence of strangers, they disappeared entirely during sleep, and temporarily while playing a shot at billiards and while catching or throwing anything, and while batting. This patient's father and sister were somewhat similarly affected; the father's condition had commenced at the age of nineteen and become progressively worse. The patient's paternal aunt and great aunt have been likewise affected, although the family history was barren of any insanity, consanguinity, mental deterioration, epilepsy, migraine or chorea. The differential diagnosis of this familial myoclonia is from Huntington's chorea, epidemic myoclonus multiplex, hysteria, Fried-

reich's *paramyoclonus multiplex*, and Unverricht's epileptic variety. The pathology is admittedly obscure, but there is apparently some justification for placing the lesion in the mid-brain, probably between the *corpus striatum* and the *globus pallidus*, in which "the tonetic function of the neostriatum is affected".

Psychogenesis in Hyperthyreosis and Rapid Heart Imbalance.

BELA MITTELMANN (*Journal of Nervous and Mental Disease*, May, 1933) has endeavoured to probe the psychogenic factors which play a part in the production of Graves's disease and the associated autonomic imbalance. Investigation involved an analysis of the patients' reactions to environment with regard to emotional stability, sex life, financial status and past psychopathological episodes. An attempt was made on analysing the clinical material to elicit the psychic trauma relating to the onset of symptoms. Eighteen case histories are presented and summarized. It was found in all cases that there existed a very close relationship in time between the psychic trauma and the onset of the initial symptoms, such time hardly ever being longer than from seven to fourteen days. It was further found that these patients possessed sensitized points in their psychological make-up traceable to infantile traumas, which in being reactivated led to the onset of such conditions as hyperthyreosis and rapid heart imbalance. The author regards the deeply buried infantile injury as practically equivalent to an organic damage.

Oxygen Therapy in the Psychoses.

J. NOTKIN, J. G. WILLIAM GREEF, F. N. PIKE AND J. A. KILLIAN (*American Journal of Psychiatry*, May, 1933) have made experiments on the subcutaneous administration of oxygen in the treatment of psychotic patients suffering from involitional melancholia, manic-depressive psychosis, *dementia praecox* and epilepsy. Each patient was given an initial insufflation of 500 cubic centimetres of oxygen and subsequent insufflations of 1,000 cubic centimetres. Exhaustive physical and biochemical examinations were carried out prior to the administration of oxygen, and subsequently a blood count and gas analysis were performed. A comparative study of the findings in all groups could not be presented accurately on account of lack of uniformity in the number of patients in each group. But generally no significant change in the blood was observed after oxygen administration. There was a general tendency to a slight fall in blood pressure following the oxygen administration. The pulse rate decreased in all cases, except for the manic group, in some of which it was increased. Basal metabolic rates for the most part were normal. In general, oxygen therapy produced no consistent results, except that what little improvement there was in the

dementia praecox and manic-depressive groups was higher than that observed in the other groups.

Acute Schizo-Affective Psychoses.

J. KASANIN (*American Journal of Psychiatry*, July, 1933) reports nine cases of a mental disorder resembling *dementia praecox*, yet possessing many of the clinical features of manic-depressive insanity. The mental trouble in these cases was characterized by a very sudden onset in a setting of marked emotional turmoil. The patients were young, active and intelligent, and in good physical health. They had average mental capacity and were able to cope with the particular work they were engaged upon at the time of breakdown. The chemical and serological tests of blood, urine and cerebro-spinal fluid were normal without exception. Some of the patients exhibited the prepsychotic character traits of inferiority and feelings of subjectivity, and the actual psychosis was ushered in by a latent depression and rumination over sexual conflicts or environmental maladjustments. Upon the development of the psychotic state there were false sensory impressions and distortion of the features of the outside world. Impulsive outbursts of hostility and violence were not infrequent. Bizarre delusions developed in rapid succession. The author states that the prognosis in these cases is good, the illness lasting from a few weeks to a few months. The return of critical judgement is quick and definite. The achievement of a good social and industrial adjustment, the presence of a definite and specific environmental stress, the interest in life and its opportunities and the absence of any passivity or withdrawal are some of the factors which this author considers favourable to recovery. Some of these patients had sustained a mild breakdown in late adolescence, but otherwise the past histories were not unusual.

Bromide Psychoses.

MAX LEWIN (*American Journal of Psychiatry*, May, 1933) has studied the effect of bromide on the human organism and finds that from the psychopathic point of view the patient may, following massive doses or the prolonged administration of bromide, develop: (i) a state of bromide intoxication, (ii) a bromide delirium, or (iii) a definite psychotic state. He quoted one case of bromide hallucinosis. In addition to the well known symptoms of delirium, the author noted disturbances of sensation, subjective difficulty in recognizing colours, macropsia, micropsia *et cetera*, and disturbances of the association of ideas, of the type commonly seen in schizophrenia. Lewin further suggests the possibility of a "post-intoxication psychosis" in which a woman previously non-psychotic developed a bromide delirium which persisted after the withdrawal of the drug.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Anatomy Theatre, University, Adelaide, on August 31, 1933, DR. E. BRITTEN JONES, the President, in the chair.

Radium Treatment.

DR. JOHN MAYO read a paper entitled: "Some Aspects of Modern Treatment by Radium" (see page 643).

DR. B. S. HANSON said that when Dr. Mayo offered him a "pre-reading" of his paper he suggested that it was a difficult thing to be sufficiently technical to interest those practically concerned with radiotherapeutics without being so technical as to bore those men whose interests were more general. With this they must all agree; but Dr. Mayo had admirably succeeded in interesting them all. The tables of figures which had been shown must convince all but the most "die-hard" of surgeons that radium therapy, although still in an experimental stage, was no longer on its trial. The sites which Dr. Mayo selected as offering the greatest hope of success were mostly those in which a squamous epithelioma was commonly found and, with a few modifications, were in accord with results obtained in Adelaide. In discussing these results they had to ask why radiotherapy was ever preferable to surgery, and the answer, of course, was first that radium therapy was less mutilating. This was always desirable and might be a very important factor when dealing with an organ of which the presence was essential for continued life. And secondly, radium treatment was not quite so local as a surgical operation must of necessity be. In treating an epithelioma of the lip, therefore, a surgeon might or might not dissect out the glands, but he excised the primary ulcer with a fair prospect of success in many cases; in a definite proportion, however, local recurrence occurred. With radium the whole lip and chin might be treated at the one operation and the area treated should extend down to cover the immediate lymphatic drainage. In such a site, then, Dr. Hanson considered that radiotherapy was the treatment of choice. The breast, however, was a different proposition in that a good radical removal, which was not particularly dangerous in itself, cleared out the primary tumour and a large proportion of the lymph drainage areas. Every patient with an operable breast tumour should be given this chance. Combination with radiotherapy was extremely desirable, either reinforcing weak points with radium tubes after the practice of Sampson Handley, or treating the whole area with deep therapy. To Dr. Hanson's mind the latter course was desirable. In the Bier Clinic in Germany, where surgical technique had been standardized over a number of years, the five-year cure rate for straight-out surgery in cancer of the breast was in the region of 30%. Since the adoption of pre-operative and post-operative X radiation in addition, the five-year cure rate had jumped to 53%. This was obtained by good surgery combined with good X ray therapy.

Dr. Hanson was interested in Dr. Mayo's remarks concerning radionecrosis following treatment of carcinoma of the vulva. One realized that erectile tissue at the best of times was prone to necrosis, but it seemed that the spatial relation of needles inserted when the patient was in the lithotomy position must be considerably modified when the patient was placed in bed with the thighs together. Dr. Hanson would be interested to know whether any special care was taken in nursing such patients at the Middlesex Hospital.

In the multiple gramme bomb Dr. Mayo saw the greatest hopes for improvement in results. With radium costing between £15,000 and £20,000 per gramme this was obviously an economic improbability, at least in South Australia. Dr. Hanson described radium therapy as being in an experimental stage, and if that were true he thought it was far more true of deep X ray therapy. Here the tube was the limiting factor, but that tensions up to 1,000,000 volts might enter the realm of practical therapy

was indicated by the use in Germany of an experimental tube of entirely new design operating at 7,500,000 volts. The cathode rays, which were influenced by a magnetic field and therefore might be focused, were used from this tube, but biological results were not to hand, owing to the difficulty of obtaining animals sufficiently hardy to stand up to this treatment, even when the intensity was reduced a thousandfold.

In conclusion Dr. Hanson expressed his pleasure at having an opportunity of discussing Dr. Mayo's paper and congratulated him and thanked him for his excellent review.

DR. H. A. MCCOY congratulated Dr. Mayo on the presentation of his paper describing methods of radium treatment which he, Dr. Mayo, had seen during his recent trip to Europe. It was interesting to hear of the developments in mass radium therapy. It did not seem probable that they would be in a position to use such a unit in Adelaide at present.

DR. MCCOY referred to methods adopted at the Adelaide Hospital for the treatment of squamous-celled carcinoma of the skin, and particularly to the results obtained in epithelioma of the lip. He suggested that the method used, namely, embedding of needles into the tissues of the lip, resulted in most cases in very satisfactory cosmetic results. There seemed no reason, therefore, to adopt a more cumbersome treatment by a surface applicator.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Melbourne Hospital on May 17, 1933. The meeting took the form of a series of clinical demonstrations by the members of the honorary staff. Parts of this report have appeared in the issues of October 14 and 21 and November 4, 1933.

Scleroderma.

DR. L. E. HURLEY showed a female, aged twenty-one years, who had been first seen on May 10, 1932. She had been well until about two years before this, when she had noticed that her fingers would suddenly go white and cold, and later blue, and then red. About the same time, and during the winter months, small sores had developed on the knuckles and the tips of the fingers, but these had healed in the following summer. She had also complained of numbness and tingling in the hands in the cold weather. About two years ago the whole of both hands and the lower part of the forearms to about five centimetres (two inches) above the wrists had become swollen, and as the swelling subsided marked stiffness and contracture of all the digits of both hands had developed. During last winter painful ulcers had again appeared on the knuckles of both hands. On examination there was marked coldness of both hands and the lower parts of the forearms to 7.5 centimetres (three inches) above the wrists. Good pulsation could be felt in both radial and ulnar arteries. On elevation of the upper limbs marked pallor developed in the hands, and on dependency they became a deep red colour. Ulcers were present on the knuckles of both hands. The skin of both hands and the lower half of the forearms was tense and firm and could not be lifted up into a fold. Small areas of leucoderma and also of increased pigmentation were present on both hands. There was marked stiffness and a gross degree of flexion contracture in all the digits and to a less extent in the wrist joints. In the lower limbs, although no symptoms had been complained of, the skin was tense and firm as far up as the upper third of the leg, and could not be lifted up in a fold. The feet and lower part of both legs were cold to palpation. The skin of the face showed slight but definite loss of elasticity. Physical examination revealed nothing further of note.

In December, 1932, DR. A. E. COATES did a sympathectomy on the left side of the neck. As a result the left hand was now definitely warmer than the right, but there had been no material improvement in the stiffness and the rigidity. The patient, however, stated that not only did the left hand feel warmer than the right, but it also felt more comfortable. The trophic ulcers healed with

equal rapidity on the two sides with the approach of the hot weather. Enophthalmos, slight ptosis, and a small pupil also developed on the left side after the operation. Thyroid extract in doses of 0.12 to 0.18 grammes (two to three grains) had been given three times a day for several months. X ray treatment to the hands had also been tried. Massage and continued extension to the fingers seemed to increase the mobility of the fingers more than any other measure, and there was no material difference in the improvement on the two sides.

The aetiology and the pathology of the localized and diffuse types of scleroderma were briefly discussed by Dr. Hurley. He said that two main theories as to the cause of the condition had been postulated, but neither of them was very convincing. One theory regarded the pathological changes as being secondary to endarteritis and narrowing of the smaller vessels in the skin, whilst the other considered it to be due to ductless gland disturbance, particularly of the thyroid and the pituitary. No satisfactory explanation was offered for the endarteritis.

In discussing the diagnosis of scleroderma from Raynaud's disease, Dr. Hurley said that vasospastic phenomena were often seen in cases of scleroderma, either at the onset or later in the course of the disease. In Raynaud's disease, however, there were no colour changes on elevation and dependency, and the trophic phenomena followed after and were confined to the areas where vasospastic phenomena had been observed, whereas in scleroderma the thickening of the skin was much more widespread.

Osteomalacia.

Dr. Hurley also showed a female patient, aged twenty-three years, who had been first seen on September 9, 1932. She had been quite well until three years ago, when she had noticed slight puffiness about both ankles, which came up during the day and disappeared after the night's rest. Twelve months ago she had noticed pain along the spine, which was somewhat increased by movement. Resting for any length of time in the one position would cause the back to become painful and stiff. In the past two months she had noticed pains about the knees and legs. During the past year or two she stated that she had become several inches shorter, her gait had become awkward, and she had noticed some general weakness. There had been no loss of weight and no urinary symptoms. The appetite had been good and for many years the bowels had been inclined to be constipated.

On examination the gait was distinctly waddling and clumsy. The head was held slightly forward, and there was a moderate general kyphosis. The thorax was markedly approximated to the pelvis, a deep groove intervening. On measurement she was ten centimetres (four inches) shorter than her sister, who, she stated, was of the same height two years ago. There was also slight general enlargement of the thyroid gland, but no localized tumour could be felt. X ray films of the spine, pelvis, tibiae and bones of the feet were taken. All the bones showed marked generalized decalcification, which was most evident in the dorsal spine, several segments of which showed definite compression and reduction in thickness. The decalcification was also evident in the ribs, but was not so marked in the bones of the lower limbs. The blood calcium was 11.5 milligrammes and the blood phosphorus 3.4 milligrammes per hundred cubic centimetres.

Treatment with cod liver oil, phosphorus, "Viosterol" and calcium had been commenced and she was also advised to get as much fresh air and sunlight as possible. Under this treatment her general health had improved, she felt stronger, and X ray examination of the bones, made about four months later, showed some increase in bone density. Dr. Hurley said that in the absence of any definite elevation of the blood calcium it was not thought advisable to explore for the possible presence of a parathyroid tumour. Excessive function of the parathyroids usually produced a picture of generalized *osteitis fibrosa*, but at times gave rise to osteomalacia, in which case the blood calcium was elevated. In view of the definite improvement in the patient's condition, it was

considered advisable to continue with the treatment above outlined. The aetiology and pathology of osteomalacia and its diagnosis from *osteitis deformans* and *osteitis fibrosa cystica* were briefly discussed.

Primary Ovarian Pregnancy.

Dr. Hurley also exhibited microscopic sections of an ovum, about nineteen days old, obtained from a case of primary ovarian pregnancy. The patient had been first seen on Saturday, May 30. The previous menstrual period had commenced fourteen days before, lasted for seven days, and had been quite normal, both with regard to its time of onset and duration. Five days after the termination of this period the patient complained of severe colicky lower abdominal pain, which had lasted on and off for several hours. Three days later the pain had recurred and was rapidly followed by signs and symptoms of severe internal hemorrhage and accompanied by pain in the left shoulder. On examination the patient was very pale, cold and collapsed. The pulse was 140 to the minute and very feeble. There was generalized abdominal tenderness and signs of free fluid were present in the flanks. Before operation a very tentative diagnosis of ruptured ovarian pregnancy was made, owing to the fact that the previous menstrual period had been absolutely normal in every respect.

Immediate laparotomy was performed by Dr. Allan Hailes. The abdominal cavity contained a large amount of blood. One Fallopian tube had been removed previously, but the remaining tube was quite normal. The left ovary showed a ruptured cavity about one centimetre in diameter, from which a small amount of blood was oozing. The ovary was removed and an autotransfusion was performed. While blood was being swabbed from the abdomen a small complete ovum was discovered. The maximum external diameter of the ovum was eleven millimetres and the minimum diameter six millimetres. The external aspect of the ovum was completely and evenly studded with villi. In the section exhibited the embryonic area with its three primary germinal layers could be seen between the amniotic and yolk cavities. The transverse diameter of the embryonic area was a little more than one millimetre. The notocord was fused with the hypoblast, and the earliest beginnings of the medullary plate and folds could be seen.

Acromegaly.

Serial photographs of a typical case of acromegaly were also exhibited, along with an X ray film of the skull of the same patient, showing considerable enlargement of the *septa turcica*. The pathology and clinical features of acromegaly were briefly outlined and the indications for operative interference were discussed. It was generally agreed that operation was indicated in the presence of signs of increased intracranial pressure or limitation of the fields of vision. In the absence of these features, however, operation had to be considered if the deformity were progressive and the patient a reasonable surgical risk.

Intracapsular Fracture of the Femur.

DR. CHARLES LITTLEJOHN showed three cases to illustrate the results of Smith-Peterson's operation of nailing the fragments in intracapsular fracture of the neck of the femur. The nail, triradiate in form and about 7.5 centimetres (three inches) in length, was made of stainless steel, which did not appear to cause bone necrosis. Dr. Littlejohn demonstrated the technique of the operation on the skeleton, which was held in position on Ord's traction apparatus. In practice the operation was conducted under local anaesthesia with "Novocain", the fragments being manipulated into position and maintained thus by traction and support on the apparatus. An incision was made on to the greater trochanter and a small drill was passed through the trochanter and neck into the head of the femur. A control X ray picture was then taken, and if the position of the drill proved satisfactory, it was withdrawn and the triradiate nail was driven as nearly as possible along the same path. Frequently the patient could be persuaded to walk out of the theatre, creating a

good psychological effect on patients who were under the impression that their walking days were over. Active movements were commenced immediately.

The results were surprisingly good, and the method, which had been used originally for patients who appeared unlikely to survive the ordeal of months in plaster, was now being employed to save time and uncertainty in stronger and healthier patients. Control X ray examinations made in cases in which operation had been done some months previously showed bony union of the fragments.

Many questions were asked as to the ultimate fate of the nail and of the bone in its immediate vicinity. In reply, it could only be pointed out that up to the present there was no record in the literature of any late ill effects; this series was of too recent date to form any basis for argument.

A Possible Pituitary Tumour.

DR. CLIVE EADIE showed a male patient, aged forty-four years, who was admitted to hospital on March 5, 1933, complaining of failing eyesight and severe headaches.

The patient had suffered from sciatica and rheumatism nine months previously, from typhoid fever twenty years previously, and from influenza in the 1919 epidemic.

The headaches commenced in October, 1932. They would last one to two days. They were situated in the frontal and parietal region. In November, 1932, the patient noticed failing vision. Ophthalmic examination was made on March 5, 1933. Well marked bitemporal hemianopia was present. Right central vision was still present, but the left was affected. The pupil reacted very sluggishly to light. The retinal veins were full. The fundi were otherwise normal. Examination of other central nerves revealed no abnormality. The Wassermann test gave no reaction. An X ray examination of the skull revealed a very large pituitary fossa.

On April 24, 1933, as coryza was still present, operation was postponed. On May 8, 1933, operation was undertaken with the patient under ether given intratracheally. An incision was made in the upper gum margin and the lip was elevated. The nasal septum was resected back to the anterior walls of the sphenoidal sinuses. These sinuses were opened. The left was found filled with thick yellow pus and the whole lining membrane of the cavity was congested and polypoidal. This was all removed. The bulging of the floor of the *sellae turcicae* was well seen. No decompression was done on account of the infected sphenoidal sinus. The incision was sutured.

The patient made an uneventful convalescence and up to date, May 23, 1933, had had no recurrence of his severe headaches. No apparent change had taken place in the fields of vision.

Dr. Eadie said that the probability that his symptoms were due to a gross chronic infection of his sphenoidal sinuses with periodic acute exacerbations arose. The optic nerves were possibly directly involved and the swelling of the pituitary gland was possibly due to inflammatory hyperplasia and congestion. Should the indications still point to an actual tumour of the pituitary gland, the floor of the sella being readily seen on examination through the nasal passage, a decompression operation and exploration of the pituitary gland could readily be carried out.

Meningitis due to Acute Nasal Sinusitis.

Dr. Eadie also showed a woman, aged twenty-seven years, who was admitted to hospital on March 14, 1933, with a provisional diagnosis of meningitis.

The illness began on March 1, 1933, with a "cold in the head". The patient complained that her legs and back were cold and numb. On March 6, 1933, she still had a cold in the head, headache and sore throat. On March 8, 1933, the throat was sore and the voice husky. On March 9, 1933, the throat was very sore. Headache was present and the patient had pains in the back and legs. She stayed in bed.

On March 10, 1933, she vomited bile, had diarrhoea, and complained of sleeplessness, cough and headache. On March 12, 1933, she was very restless, drowsy, but not

sleeping. On March 13, 1933, she was very restless. Headache was severe. On March 14, 1933, the patient complained of headaches, of stiff neck, and of some deafness for the last four days. Some epistaxis was present.

Examination at the time of admission to hospital revealed a temperature of 40° C. (104° F.), a pulse rate of 112 and a respiration rate of 28. The heart, lungs and abdomen were normal. The biceps and triceps jerks were not active. The knee jerks and the ankle jerks were active. The plantar reflex was flexor. A double Kernig sign was present and the neck was stiff.

On March 15, 1933, the cerebro-spinal fluid was clear, its chloride and globulin content was increased. Eighty small mononuclear cells were seen.

On March 15, 1933, signs of suppuration of the maxillary antrum and right sphenoidal sinus were found.

X ray examination of the nasal sinuses revealed a small frontal sinus with moderate translucency, slightly diminished translucency of the ethmoids; mucosal thickening in both antra.

Suction exploration of the sinuses and disinfection were performed. The nasal sinusitis then gradually subsided and all symptoms disappeared.

On March 17, 1933, the ophthalmologist (Dr. L. Mitchell) reported that the veins of the retina were very congested and tortuous. The nasal half of each disk was very hazy, but as yet there was no swelling.

Dr. Eadie said that this was obviously a case of an acute nasal sinusitis giving rise to symptoms of meningitis. The sequence of events from the onset of the infection appeared very instructive.

Cases Resembling Pulmonary Carcinoma.

DR. DOUGLAS THOMAS showed two cases in which the diagnosis of pulmonary carcinoma had been made and then abandoned. In both cases X ray examination of the lungs had shown a large hilar mass. The first case was that of a man, aged fifty, subsequently shown to be pneumonokoniotic only, whereas superimposed malignant disease was at first suspected. The second patient, a man of sixty-six, was subsequently regarded as suffering from a chronic form of tuberculosis.

A series of films of proven cases of primary lung carcinoma was shown and the differential diagnosis was discussed.

Ophthalmic Conditions.

DR. LEONARD MITCHELL showed a male patient, aged thirty-nine years, with a systolic blood pressure of 270 millimetres, suffering from attacks of vomiting and with incipient uremia, a trace of albumin in the urine, but with a typical fundus picture of albuminuric retinitis.

Dr. Mitchell's second case demonstrated a mild degree of optic neuritis in one eye and marked choke disk in the other, associated with secondary carcinoma of the brain, following radical removal of the breast three months previously.

Dr. Mitchell also showed typical examples of optic atrophy, *retinitis circinata*, thrombosis of the retinal vein, and specific chorioido-retinitis.

Pyorrhoea Alveolaris.

DR. J. MONAHAN LEWIS showed a male patient, aged forty-two years, for whom an extensive *pyorrhoea alveolaris* had been surgically treated eighteen months previously. The patient, who was now in the best of health, was originally referred to Dr. Lewis at the dental clinic by the late Dr. Mervyn Stewart, who was treating him for furunculosis and general debility.

Favourable local conditions seemed to warrant treatment rather than extraction of the teeth. This was carried out and consisted in the main of complete removal of all infected gum tissue and alveolus beneath.

The result fully justified the course followed, the patient having lost four posterior teeth only. He now retained nearly all the natural teeth, which were much more serviceable for mastication and gave less trouble than artificial dentures. On examination the gum tissue was seen to be pink and healthy and there was no trace of the former long-standing infection.

Dr. Lewis also demonstrated a number of sections made by the exacting celloidin process. These were made from specimens taken *post mortem*, and included alveolus, gum and tooth, which were shown in their proper relationships.

Examination of the sections showed pyorrhœa to be primarily an ulcerative process within the free edge of the gum. By means of the Proni projector throwing the image of the sections on a white background, Dr. Lewis was able to describe the technique followed in the surgical treatment of the disease.

The Interpretation of Oral Radiographs.

DR. W. E. FLEMING, honorary dental surgeon to outpatients, gave a demonstration of oral radiograms. He said that the main purpose of his demonstration was to show some of the less obvious radiographic signs of infection about the teeth and jaws, and to indicate some common errors in the interpretation of dental X ray films. Recent investigation had supported the belief that often those cases which demonstrated radiographically large dark areas of rarefaction in the bone surrounding the teeth were not as important from the point of systemic infection as other cases in which pathological changes were much less apparent. These less apparent changes were shown to be: (i) a certain haziness or dulness in outline in the anatomical details of the structures surrounding the teeth, (ii) thickening of the periodontal membrane, (iii) breaks in the *lamina dura*, (iv) irregular thickening or "beaded" appearance of the *lamina dura*, (v) changes in the shape of the bone cells due to breaking down of intercellular septa, (vi) thickening of the *lamina dura*, hypercementosis of the tooth roots, general condensing osteitis of the bone surrounding the tooth. (These changes generally indicated a low grade chronic infection.)

It was pointed out that X ray films of the teeth often did not yield conclusive evidence as to whether teeth were infected or not. Early acute infections were usually radiographically "negative" and even chronic infections of long standing might show very little radiographic evidence of their existence.

The importance was stressed of combining careful clinical examination with X ray diagnosis in any cases of suspected oral infection.

Common pitfalls in diagnosis were shown: (i) The mistaking of the mental foramen for an area of bone rarefaction at the apex of a lower bicuspid tooth, (ii) the shadow of the nasal sinus resembling an infected central incisor, (iii) the coronoid process of the mandible resembling an unerupted upper third molar tooth, (iv) cases in which radicular cysts had been mistaken for the maxillary sinus, (v) developing teeth in young subjects with root apices not fully formed, showing an appearance which might be mistaken for rarefying osteitis.

Other films were presented, showing residual infection persisting in the jaws many months or even years after the removal of infected teeth, and some films of general interest, such as cases of impacted teeth, cysts of the jaws *et cetera*.

X Ray Examination of Devitalized Teeth.

DR. KENNETH SKUES demonstrated X ray photographs to show devitalized teeth with root fillings. These root fillings either filled the root canals entirely or only partly filled the canals.

Dr. Skues said that the value of root fillings was often judged by the extent to which the root canals of a tooth were filled. The root filling almost universally used was a combination of oxparsa paste—the essential constituents of which were formaldehyde, thymol, alum and creosote 40%—and gutta-percha points.

If a pulp canal was filled right to the apex of a tooth, this was often considered ideal. In a radiograph shown one patient had upper right first and second bicuspids both devitalized and each with the apical half of its canal unfilled. One tooth showed an absolutely healthy apical condition with the *lamina dura* of the surrounding alveolar bone quite unbroken. Dr. Skues pointed out that this latter condition was an excellent guide to the good health of a devitalized tooth.

The next tooth showed a thickening of the root end—a typical proliferative type of condition associated with chronic inflammation. The line of the *lamina dura* was indefinite around the apex of the tooth.

Another case showed an upper central incisor with the root canal filled right to the apex. There was an apical area of rarefied bone around this tooth showing irregular margins. Clinically this was an acute inflammatory condition when the tooth was opened up.

Other teeth were shown in which the root fillings completely filled the canals, and these teeth were in an absolutely healthy condition.

Dr. Skues said that this series of X ray photographs was demonstrated to show that it was the primary treatment of the tooth before the canal was filled which was the important factor in root fillings. The clearing up of any apical infection by medication through the root canal, the sterilizing of the root canal, and the aseptic insertion of the root filling were the important factors in obtaining good results.

The amount of root filling used was not important. In many cases, providing the entrance to the root canals was sealed with sterile wax, there was no necessity for any root filling at all. It was preferable to introduce as little foreign substance as possible into any part of the body, and for that reason excessive amounts of gutta-percha and other root fillings would not be tolerated.

A devitalized tooth, efficiently root filled and in a healthy condition, should not be condemned just on account of its lack of vitality.

Skigrams.

DR. HOWARD F. PRAAGST showed a series of X ray films illustrating various types of bone neoplasms and dystrophies; hydatid of the ilium; an unusual case of infected hydatid of the liver, which contained gas and showed a fluid level above which the outlines of multiple daughter cysts were evident; neoplasms of the colon examined by opaque meal and enema; and intravenous pyelograms.

One case of special interest was that of a woman, aged forty-two years, who had had a hemithyroidectomy performed for a colloid goitre five years previously. When the patient was referred to the X ray department for examination of the trachea, the films disclosed a well marked generalized increase in density of the cervical vertebrae and of all bone structures included in the area examined. Examination of other bones revealed a similar condition, which closely resembled that of marble bones, as first described by Albers-Schönberg, but the blood examination showed no anaemia. The calcium content of the blood was normal. This case was being further investigated.

Broad Ligament Infection Simulating Malignant Disease.

DR. JOHN GREEN showed a married woman, aged twenty-eight years, who had had three children and who complained of six months' weakness with rapid loss of weight (31.5 kilograms or five stone in eight months). She was referred from a medical clinic and appeared grossly emaciated.

On examination the patient was grossly cachectic, had some slight rise of temperature and a rapid pulse. There was a hard mass about the size of an orange related to the right cornu of the uterus, and a somewhat flattened mass on the lateral wall of the pelvis rising into the right iliac fossa, where it was palpable. X ray examination revealed no abnormality and the Wassermann test gave no reaction. Blood examination showed a marked secondary anaemia.

In the diagnosis many possibilities were considered, including: (i) malignant disease with glands on the pelvic wall; (ii) secondary pelvic malignant disease, such as Krukenberg tumour; (iii) incomplete resolution of cellulitis.

It was decided to perform an exploratory operation, and the patient went on to the table with a pulse rate of 140. Operation showed a hard doughy mass occupying the broad ligament and glued to the right side of the uterus; the round ligament ran over the mass and the tube and

ovarian remnants were spread out over it. There was an independent plaque-like mass on the side wall of the pelvis. The masses appeared to be chronic and inflammatory and did not appear to be easily removable. The mass on the side of the uterus was found to contain pus at the centre. A tube was put into this thick-walled cavity, which was marsupialized, and the abdomen was rapidly closed.

Dr. Green pointed out that the patient had greatly improved. At a later date it was hoped to remove any residual tubo-ovarian mass.

Bladder Obstruction: Fibroids et cetera.

Dr. Green also showed a married woman, aged forty-three years, who had had two children and who complained of lower abdominal pain for six weeks. Subsequent history elicited that she had had retention of urine on one occasion only before admission to hospital.

On examination there was a tender nodular tumour rising out of the pelvis and a hard mass in the pouch of Douglas. The patient was put on the waiting list, but was seen a few weeks later with a swelling which simulated an eight months pregnancy. The patient's bladder was catheterized and twenty ounces of urine were withdrawn with no obvious change in the tumour.

The patient was admitted for operation on the diagnosis of fibroid uterus with possibly malignant disease and/or haemometra, but the question of retention was not entirely lost sight of.

In spite of catheterization prior to operation, further catheterization was done on the table, when the patient was examined under the anaesthetic, and the tumour was shrunk to the umbilicus. A catheter was left *in situ* while the abdomen was opened and a considerable amount of urine was expressed by hand from an extremely thick-walled (one centimetre) bladder.

The obstructing pelvic condition was compounded of multiple fibroid, pyosalpinx, hydrosalpinx, and adhesive peritonitis. The tubes were removed independently, the uterus was then removed, and finally a large fibroid growing from the posterior aspect of the cervix and below the pouch of Douglas was shelled out.

The patient made satisfactory progress but required considerable catheterization for residual urine. An interesting feature was the profuse diuresis after operation, up to 150 ounces of urine being secreted in the twenty-four hours.

MEDICO-POLITICAL.

THE following statement has been received from the Council of the Queensland Branch of the British Medical Association for publication in THE MEDICAL JOURNAL OF AUSTRALIA.

The Council of the Queensland Branch of the British Medical Association wishes to congratulate the Editor on the able article on the Federal Council in THE MEDICAL JOURNAL OF AUSTRALIA, September 30, 1933.

The Council of the Queensland Branch is of the opinion that the Editor has done well in drawing attention to the importance of the advent of the Federal Council and wishes to add its support to his views as to the manner in which the Federal Council should function.

The problems facing the Federal Council are very many, some old, some new; they must engage the earnest attention of the new Council. The task is not rendered more easy by the fact that the solution of some of the problems has been long delayed.

While the Branches may do much to help the Council, the Council must do much to help itself and the Branches. As the Editor has indicated, leadership is required, and to clear away many difficulties the old slow moving machinery must be abolished.

The Chairman of a Committee is replaced by a President of a Council that represents the medical profession in Australia. We look forward to the policy speech of the Medical Prime Minister.

The Queensland Branch is arranging that its representatives shall give consideration to the question of the

Federal Council outlining its policy on all the important matters that have been considered in the past by the Federal Committee.

We appreciate the difficulties of the situation. So much so that we think that the time has arrived for the consideration of the appointment by the Federal Council of a full time Secretary. The many questions of national importance that are facing the profession in Australia indicate the need for this progression in the evolution of an organization that, as so often has been the case, is developing along similar lines to its prototype, the parent body of the British Medical Association.

Medical Societies.

MELBOURNE PÄEDIATRIC SOCIETY.

A MEETING OF THE MELBOURNE PÄEDIATRIC SOCIETY was held at the Children's Hospital, Carlton, on August 9, 1933, DR. F. KINGSLEY NORRIS, the President, in the chair. The meeting took the form of a series of clinical demonstrations.

Congenital Absence of the Pectoral Muscles.

DR. T. FRANK showed a boy of seven years who had been referred by the school doctor for examination of his chest. He had a slight degree of pigeon chest, a flattening of the right side of the chest anteriorly and laterally, a right nipple smaller than the left, and absence of the sternocostal head of the *pectoralis major* and of the *pectoralis minor* muscles. There was a fold of skin taking the place of the anterior axillary fold. The deltoid muscle and the clavicular head of the *pectoralis major* were very well developed. The muscles of the back were all well developed and the scapulae were normal. The muscular power in the right arm and shoulder were quite good, and the boy suffered no disability from the malformation. There were no other malformations and no family history of such. A radiograph of the chest showed that the right fourth rib was abnormally short and slender.

Dr. Frank said that the condition, although described in text books, was rarely seen. Schlesinger saw only five cases in 54,000 patients in Vienna, whilst Morley saw six cases in recruits during the war. Alstead reported in a recent issue of *The Lancet* that 244 cases of the condition were recorded in the literature. The extent of the deficiency was variable, but complete absence of the *pectoralis major* and *minor* was rare, the clavicular portion of the *pectoralis major* being nearly always present to some extent. Severn, in *The Lancet* in 1921, reported the only case in which there was a bilateral absence of both muscles. Lewis's explanation of this anomaly (quoted by Morley) seemed to be the best. At the end of the fourth week of development in the human embryo the primitive pectoral muscle lay above the level of the first rib. At the end of the fifth week it extended lower, but had no attachment to the ribs or humerus. It was still undifferentiated in its component parts, except that the *pectoralis minor* was indicated by a bulge towards the coracoid process. By the seventh week the clavicular portion had become split off and then the remainder divided into the sternocostal head and the *pectoralis minor*. The probable reason why the pectoral head was so seldom absent was because the pectoral *Anlage* had been formed but had not become differentiated, while the reason for the defect being most marked at the caudal end was that the muscle mass had a cervical origin and had failed to migrate caudally to a sufficient extent for an attachment to the ribs and sternum to take place.

Hallux Rigidus.

DR. J. G. WHITAKER showed a girl of eleven years who had kicked the end of her toe some months previously and had slowly developed pain in the great toe joint, which was worse on walking. On examination the toe appeared normal, but there was great limitation of dorsi-

flexion with pain on attempting it. A radiograph revealed no abnormality at all. As dorsiflexion was the one movement that took place at the great toe joint during walking, this girl suffered great pain and disability on attempting to walk. Dr. Whitaker said that *hallux rigidus* was a highly important condition because of its insidious onset and the great disability it caused the patient. Though common in adults, it was fairly rare in children. The most important features were that the toe appeared normal, the radiograph was normal, plantar flexion was normal, and unless the movement of dorsiflexion was tested the condition would not be recognized. The differential diagnosis was from a fractured sesamoid bone, but the X ray examination would reveal this. It occurred in adolescence in children with long weak feet who walked with the foot everted, thereby throwing a strain on the great toe joint. This set up a periarthritis and spasm of the *flexor hallucis brevis*. In adults the condition was usually post-traumatic, as it happened to be in the girl Dr. Whitaker was showing. To avoid the pain the patient usually walked on the outer side of the foot, and this in turn gave rise to diverse pains in the foot and leg. Treatment was exceedingly difficult. In this case Dr. Whitaker had manipulated the joint under general anaesthesia and had broken down the adhesions and then applied a plaster with the toe in dorsiflexion. The condition very quickly reappeared. He had the excised the base of the first phalanx, again to no avail. He now proposed to excise the head of the metatarsal. Elmslie, Trethowan, Robert Jones and others did this, and he himself had had many excellent results from this operation in both *hallux rigidus* and *hallux valgus*. Other methods of treatment, both operative and palliative, had been recommended, but all to no avail, and he thought that excision of the metatarsal head gave the best prospects of a cure.

Hypothyreoidism.

DR. G. M. TALLENT showed a boy of four years and four months with inability to speak, slight physical retardation, and a soft enlargement of his thyroid gland. He had been a full-time baby, delivered normally and weighing 3.26 kilograms (seven and a quarter pounds). He was breast fed for a few weeks and was then fed on cow's milk. At the age of three months the family had removed to Gippsland and soon after this the mother noticed a swelling in the child's neck. He sat up at the age of six months and walked at eighteen months. His teeth did not appear till twelve months, but were then quite normal. He had never talked properly at all, although he understood speech quite well. Apart from his speech defect his mentality did not seem to be retarded. He had always been troubled with obstinate constipation. He had a pot belly and an umbilical hernia. His past history and the family history were quite irrelevant. At the age of two years he was brought to the Children's Hospital. The condition was diagnosed as hypothyreoidism and he was given thyroid extract 0.09 grammes (one and a half grains) daily for eight months. This apparently had no beneficial effect on the boy at all. The mother then took the child back to the country, since when he had had no treatment at all.

At the present time examination revealed a fairly well developed boy, pale and slightly flabby. His weight was 14.4 kilograms (thirty-two pounds) (normal weight for his age being 18 kilograms or forty pounds) and his height was 95 centimetres (thirty-eight inches) (normal 100 centimetres or forty inches). His head circumference was 51.25 centimetres (twenty and a half inches) (normal). From his umbilicus to the top of his head was 45 centimetres (eighteen inches), and from the umbilicus to the sole of his foot was 50 centimetres (twenty inches), which again was normal. In the place of the thyroid gland was a large, soft, homogeneous swelling, more marked on the left side and which moved on swallowing. It felt almost cystic and there were no nodules. Apart from the speech defect his mentality seemed normal. He had none of the stigmata of cretinism. Dr. Tallent said that because of the speech defect, the slight defect in growth, the triad of constipation, a pot belly and an umbilical hernia, occurring in a

child with a soft enlargement of the thyroid gland, he regarded the condition as one of hypothyreoidism. These cases were relatively rare in early childhood, though they were fairly common from ten years of age onwards. One feature against the diagnosis was the apparent non-improvement with thyroid extract, although as much as 0.09 grammes (one and a half grains) had been given daily for eight months, which was quite a big dose for a child of two years.

DR. J. W. GRIEVE said that he agreed with the diagnosis of hypothyreoidism. Considering that there had been apparently no response to thyroid therapy before, it was possible that the speech defect was due to a slight cerebral defect, but as the rest of the clinical picture suggested some thyroid deficiency he would persevere for a time with larger doses of thyroid extract supplemented by iodine as well.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on September 1, 1933.

Utilization of Sulphur by Animals.

MR. R. H. MARSTON outlined the recent researches on the utilization of sulphur by animals and stressed that the organism is very exacting in its demand for the sulphur-containing amino-acid, *levo-cystine*. He said that the closely related thioglycolic, β -dithio-di-propionic or β -dithio- α -di-hydroxy di-propionic acids could not be converted to β -dithio- α -di-amino-di-propionic acid (cystine) by the rat when its growth was limited by low cystine intake, nor under such nutritional stress could the animal utilize the dextro-enantiomorph of cystine. It would seem, then, that the naturally occurring *levo-cystine* could not be synthesized by the organism and that all animals depended ultimately upon the plant cells for this amino-acid. Cystine was an integral of all true proteins, and the proportion of this body in various proteins ranged from 0.2% in casein to over 13% in the keratin of wool fibre.

Both the amount of growth and the degree of keratinization of hair varied with the intake of cystine in the dietary, and wool growth in the merino sheep, which grew a fully keratinized fibre, might be limited under certain conditions by the intake of cystine.

Mr. Marston then discussed briefly the histological changes which occur during the keratinization of cutaneous outgrowths.

The Structure of Wool Fibre.

During a discussion on the structure of wool fibre Mr. Marston pointed out that recent physico-chemical research indicated that the common textile fibres were composed of submicroscopic crystalline aggregates which evidenced, in the case of cellulose, silk and wool, a well defined selective orientation. He said that the X ray diffraction pattern of the two proteins, fibroin (silk) and keratin (wool), showed that the molecules were orientated in straight line patterns parallel to the long fibre axis, and that the molecular structure of the former was one of straight and fully extended polypeptid chains, the cellular units occupying on an average 3.4 Ångström units. The diffraction pattern set up by the wool fibre, however, was strikingly different. The intramolecular pattern in natural wool was repeated at a distance of 5.1 Ångström units, which was practically identical with that occupied by each of the hexagonal glucose residues of cellulose; when stretched to approximately 100% of its length, the diffraction pattern of wool keratin changed and became identical with that of silk fibroin. This latter observation of Ashbury rendered clear what happened when wool was stretched and why this protein fibre differed so remarkably from other textile fibres. When silk or cellulose was stretched beyond the Hooke's law region of perfect elasticity they extended by a process of molecular drafting. X ray analysis confirmed this view, for the diffraction pattern was unchanged when such fibres were stretched. It followed, then, that excessive extension of such fibres

must lead to a "permanent set", as was well known in the practice of textile manufacture. Wool fibre, together with mammalian hairs generally, did not exhibit this property; it might be stretched to extraordinary lengths and would exactly recover its natural length when released in water. The X ray diffraction pattern of stretched wool was entirely different from that of the unstretched fibre, and the latter was practically identical with that of silk.

It was apparent that when wool was stretched there was not merely an internal drafting of chain bundles by a reversible intramolecular transform of the fibre molecules. Furthermore, it became clear that since wool was structurally analogous to silk, whether the latter was stretched or unstretched, and therefore was built of extended polypeptid chains, unstretched wool must be built of the same chains in an orderly folded state. The mechanism of its unusual elasticity was simply that of a molecular spring. The unit cell lattice spaces would suggest that unstretched natural wool was composed of a series of long chains of pseudo-diketopiperazine rings which extended to polypeptid chains on stretching. A cross-section of wool one one-thousandth of an inch thick would pass over 500,000,000 of these molecular chains. Furthermore, there seemed little doubt that in keratin the neighbouring chains were linked chemically through a system of cystine molecules.

Medical Research.

AN INTERNATIONAL STANDARD FOR ESTRUS-PRODUCING HORMONE.

For several years past the standardization of sex hormones has been on the agenda of the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations. In July, 1932, a conference of experts met at the National Institute for Medical Research in London under the chairmanship of Sir Henry Dale. This conference recommended its members to concentrate their efforts on the production of a standard for the oestrous-producing hormone, which is the only one of the sex hormones hitherto prepared in a state of chemical purity. The possibility of future agreements for the creation of standards and definitions of units for other sex hormones—the hormone (or hormones) of the anterior pituitary lobe controlling ovarian function, the male sex hormone—was also discussed and arrangements were made for cooperative investigations in different countries preparatory to such future agreements.

The oestrous-producing hormone has been prepared in pure crystalline form from the urine of pregnancy in quantities sufficient to admit of chemical examination. It has been obtained in two principal forms—a ketohydroxy and a trihydroxy form—the former being the more active, by the ordinary methods of testing, for the producing of oestrus in small animals subjected to oophorectomy.

In the past, both in scientific literature and in the issue for therapeutic use of preparations containing the hormone, its activity has been indicated in "units" of physiological activity, the "unit" used in each case being the quantity required to produce oestrus in a castrated rat or mouse. Such a procedure has resulted in the use of a wide variety of "units", varying according to the species of animals used, the methods of administration adopted, and the interpretation of the stage of oestrus accepted as indicating a "positive" effect, or in the proportion of such "positive" effects in a series of animals taken as indicating the effect of one unit.

It was agreed by the conference that the only basis for international agreement on a common unit of activity would, as in other similar cases, be found in the adoption of a standard substance in terms of which the unit could be defined and with reference to which the accepted unit could be measured by methods differing in detail. It was further agreed that the ketohydroxy form of the hormone, in pure crystalline condition, would be the suitable sub-

stance to form such a standard of reference. The standard therefore adopted by the conference for international use is a quantity of the ketohydroxy form of the hormone in pure crystalline condition, which is preserved at the National Institute for Medical Research in London, and the unit of activity is defined as the specific oestrous-producing activity contained in 0.1 γ (0.0001 milligramme) of this standard preparation.

To give practical effect to this decision of the conference, the National Institute for Medical Research, in conjunction with the Department of Physiology and Biochemistry of University College, London, prepared a standard by mixture of samples of the pure hormone in the ketohydroxy form furnished by expert workers in several different countries. This standard is being kept at the National Institute for Medical Research in London, which acts for this purpose as the central laboratory for the Health Organization of the League of Nations. The standard preparation in ampoules containing 20 milligrammes is being supplied to a number of national institutes, which will be responsible for distributing it in their respective countries.

A small supply of this standard preparation has been received by the Commonwealth Department of Health, and the Commonwealth Serum Laboratories have been appointed to act as the distributing centre for Australia. Institutions or individual investigators in the Commonwealth requiring the standard for the oestrous-producing hormone should apply to the Director, Commonwealth Serum Laboratories, Parkville, Melbourne, N.2, Victoria.

Obituary.

THOMAS RUPERT HENRY WILLIS.

We are indebted to Dr. A. S. Joske for the following account of the career of the late Dr. Thomas Rupert Henry Willis.

Rupert Willis—everybody called him Rupert—was one of those kindly men who always made friends and kept them. Qualifying in 1880, he followed Snowball as resident medical officer at the Children's Hospital. He stopped there five years. During all that time he was the guide, philosopher and friend to all of the senior medical students. We looked upon the hospital as a place to go for wise advice and friendly entertainment. When at the hospital he started a Children's Rest Home; it was the kernel from which the crèche movement grew and developed. In 1884 he was one of the founders of the Medical Students' Society. He helped to compose the "Student's Anthem", which Carl Dyring (his future brother-in-law) helped to set to music, and which Dyring was the first to sing at one of the early students' gatherings.

On leaving the hospital he started practice in Lygon Street, and then, feeling the lure of the country, settled at Daylesford. At Daylesford he still kept in touch with his Melbourne friends, and we used to pay him visits, where his kindness and charm were proverbial. When at Daylesford he married. After his two eldest sons were born he came to Melbourne for the purpose of getting them educated. He settled in Malvern. He then became associated with the Alfred Hospital and was instrumental in getting the Children's Department started there. He became the first honorary medical officer. Increasing practice led to his giving up this position, and he devoted himself to his private practice. Increasing ill health compelled him to retire some years ago. Since then he lived in partial retirement, seeing patients, who would consult no one else, occasionally. He attempted to visit Europe three years ago. But his ill health made him leave the steamer at Colombo, and after a rest he came back to Melbourne.

He was one of those rare men—honest, capable, and kindness itself. His manner was at times brusque, when he realized the unkindness and selfishness of others. He was a great reader of good books, and to talk to him on

all subjects was a liberal education. His wife, who survived him, was a marvel of devotion to him. He used to tell her that having her he was the richest and most fortunate man in Melbourne. He had three sons. His eldest is in practice in Mount Gambier; the second, the well-known cricketer, died two years ago. The youngest is in commercial pursuits in New Guinea.

Dr. Felix Meyer writes:

My recollections of Dr. Rupert Willis go back to our school days at Wesley College. We were fellow students all through our medical course, and in our fifth year were joint founders of the Medical Students' Society, to whose interests he devoted much time and energy. We were in close touch during the years of his house surgeonship at the Children's Hospital and mine at the Women's Hospital. He was an enthusiastic and hard-working resident and was highly regarded by the surgical staff of the Children's. Had he started practice in Melbourne, he would have come to the front as a children's specialist, but he preferred the country and settled down at Daylesford, where for some years he was a very busy man. On his return to the city he went to Malvern and as a general practitioner built up a wide practice. He was unsparing of himself and generous in professional service.

He was a lover of sport, an enthusiast in cricket, in which, as well as in football, he played a good game, and he was in the front rank of the medicals' hares and hounds. Until his health broke down he lived a full life—a bright and buoyant nature and a keen sense of humour were great assets. Fearless and outspoken, he had no time for half-truths and reticences; to his friends his frank and open nature made him all the more likeable. Indifferent to superficial display, he went on his useful way, a sturdy mind in a sturdy body, until the years took toll of him.

WAHAB McMURRAY.

We regret to announce the death of Dr. Wahab McMurray, which occurred on November 4, 1933, at Woollahra, New South Wales.

Correspondence.

DIATHERMY OF TONSILS.

SIR: The controversy which has recently been waged for and against the use of diathermy for the removal of infected tonsils has been very interesting to me, as I have been using diathermy in these cases for the past ten years and have also surgically removed many infected tonsils in adult subjects.

The aim in all methods is efficient removal. That complete removal of adherent infected tonsils by scalpel dissection is possible in all cases I doubt. Personally, I have had my tonsils removed on two occasions by eminent throat specialists (in Melbourne and in London). But the verdict of several throat specialists in this city was that the chronic affection from which I was suffering up to the time that I had it removed by diathermy was due to the presence of much infected tonsil residue.

In operating on adherent infected tonsils in the adult subject I have found that to safeguard against too deep dissection in a field somewhat obscured by blood, a certain amount of tonsil tissue is left. Of course, this does not occur when the tonsil is not adherent to the capsule, but non-adherent infected tonsils are few and far between and, of course, are not seen if a peritonsillar abscess has ever been present. It is necessary in these

cases, where tonsil residue is left, to resort to diathermy for its removal. Diathermy is therefore a necessary and efficient adjunct to surgical tonsillectomy, but after removing over two hundred sets of chronic infected tonsils by diathermy without preliminary surgical dissection I cannot see why the patient is subjected to a general anaesthetic and a week's hospital expenses when these can be dispensed with.

To the general practitioner there are in these days of financial distress, affecting all classes, two considerations which he must always remember: (i) the efficiency of the treatment, (ii) the financial strain on the patient.

Diathermy in my hands has proved safe and efficient, and it allows the patient to continue at his business. I have found that many adults will willingly have their tonsils removed by diathermy who have patiently borne repeated attacks of tonsillitis, rheumatism *et cetera*, rather than face the dangers, imagined or real, of the operating theatre. For myself, with the experience of two failures for the removal of my tonsils by dissection, there is only one method, safe and efficient, in chronic tonsillitis, and that is removal by diathermy.

The technique which I use is simple. By means of a special curved syringe I inject the tonsillar bed with 5% "Novocain". This I have found simple, and renders the diathermy treatment completely painless.

The efficiency of diathermy in the removal of infected tonsils I can testify to from the patient's point of view as well as that of the medical therapist.

One word of warning is necessary, however: experience is as necessary in this operation by diathermy as in any other field of surgical therapy.

Yours, etc.,

E. HENTY SMALPAGE,
M.B., Ch.M. (Eng.), F.R.C.S. (Eng.).

193, Macquarie Street,
Sydney,
Undated.

AN EXPLANATION.

SIR: In my recent report in the journal of October 14, "Three Cases of 'Luminal' Poisoning", the name "Luminal" should not have been used. The patients concerned had been given the drug before coming to the Coast Hospital. There is no doubt that the drug used was phenobarbital, but I should not have termed it "Luminal", which is a trade name, applicable to Bayer's preparation only.

Yours, etc.,

R. J. MILLARD.

135, Macquarie Street,
Sydney,
November 2, 1933.

Proceedings of the Australian Medical Boards.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Mawson, Arthur David, M.B., B.S., 1924 (Univ. Melbourne), Gormanston, Tasmania.
Carter, Harold Charles Ralph, M.B., B.S., 1924 (Univ. Melbourne), Public Hospital, Launceston.
Fulton, John Charles, M.B., B.S., 1933 (Univ. Melbourne), Public Hospital, Launceston.

Books Received.

THE TREATMENT OF RHEUMATISM IN GENERAL PRACTICE, by W. S. C. Copeman, M.A., M.B., B.Ch., M.R.C.P., with foreword by Sir William Hale-White, K.B.E., M.D., F.R.C.P., Hon. LL.D., 1933. London: Edward Arnold. Demy 8vo., pp. 225. Price: 9s. net.

THE CLINICAL EXAMINATION OF THE NERVOUS SYSTEM, by G. H. Monrad-Krohn, M.D., F.R.C.P., with a foreword by T. G. Stewart, M.D., F.R.C.P.; Sixth Edition; 1933. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 253, with illustrations. Price: 7s. 6d. net.

PEDIATRICS, by H. D. Chapin, M.A., M.D., and L. T. Royster, M.D.; Seventh Edition; 1933. London: Baillière, Tindall and Cox. Royal 8vo., pp. 791, with illustrations. Price: 35s. net.

Diary for the Month.

Nov. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 Nov. 15.—Western Australian Branch, B.M.A.: Branch.
 Nov. 21.—New South Wales Branch, B.M.A.: Ethics Committee.
 Nov. 22.—Victorian Branch, B.M.A.: Clinical Meeting.
 Nov. 23.—New South Wales Branch, B.M.A.: Clinical Meeting.
 Nov. 24.—Queensland Branch, B.M.A.: Council.
 Nov. 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 Nov. 29.—Victorian Branch, B.M.A.: Council Meeting.
 Nov. 30.—New South Wales Branch, B.M.A.: Branch.
 Dec. 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 Dec. 5.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 Dec. 6.—Western Australian Branch, B.M.A.: Council.
 Dec. 6.—Victorian Branch, B.M.A.: Annual Meeting.
 Dec. 7.—South Australian Branch, B.M.A.: Council.

Medical Appointments.

Dr. J. H. Younkmann (B.M.A.) has been appointed Medical Officer of Health by the Wagin Local Board of Health, Western Australia.

Dr. R. J. Wheeler (B.M.A.) has been appointed Medical Officer of Health by the Wongan-Ballidu Road Board, Western Australia.

Dr. E. W. Levings (B.M.A.) has been appointed Government Medical Officer at Bourke, New South Wales.

Dr. H. W. T. Chenhall (B.M.A.) has been appointed a member of the Advisory Committee for the purposes of the *Pure Food Act*, 1908, in accordance with the provisions of Section 6 (2) of the said Act, New South Wales.

The undermentioned appointments have been made to the Adelaide Hospital, South Australia: Dr. H. B. Lewis (B.M.A.) and Dr. A. L. Tostevin (B.M.A.), Honorary Ophthalmologists; Dr. M. Schneider (B.M.A.), Honorary Assistant Ophthalmologist; Dr. G. H. Black (B.M.A.), Honorary Clinical Assistant to the Ophthalmic Section.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xvi and xvii.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

PARRAMATTA DISTRICT HOSPITAL, PARRAMATTA, NEW SOUTH WALES: Junior Resident Medical Officer.

ROYAL HOSPITAL FOR WOMEN, PADDINGTON, SYDNEY, NEW SOUTH WALES: Resident Medical Officer, Junior Resident Medical Officer.

THE BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Honorary Officers.

THE UNIVERSITY OF BRISTOL, BRISTOL, ENGLAND: The Chair of Anatomy.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

| BRANCH. | APPOINTMENTS. |
|---|--|
| NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney. | Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino, Leichhardt and Petersham. United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society. |
| VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne. | All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria. |
| QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane. | Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr. |
| SOUTH AUSTRALIAN: Honorary Secretary, 207, North Terrace, Adelaide. | Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia. |
| WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth. | All Contract Practice Appointments in Western Australia. |
| NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington. | Friendly Society Lodges, Wellington, New Zealand. |

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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